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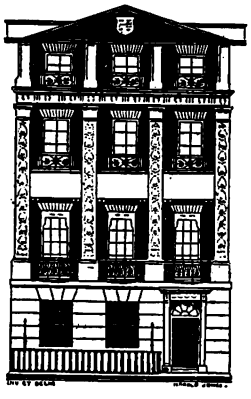

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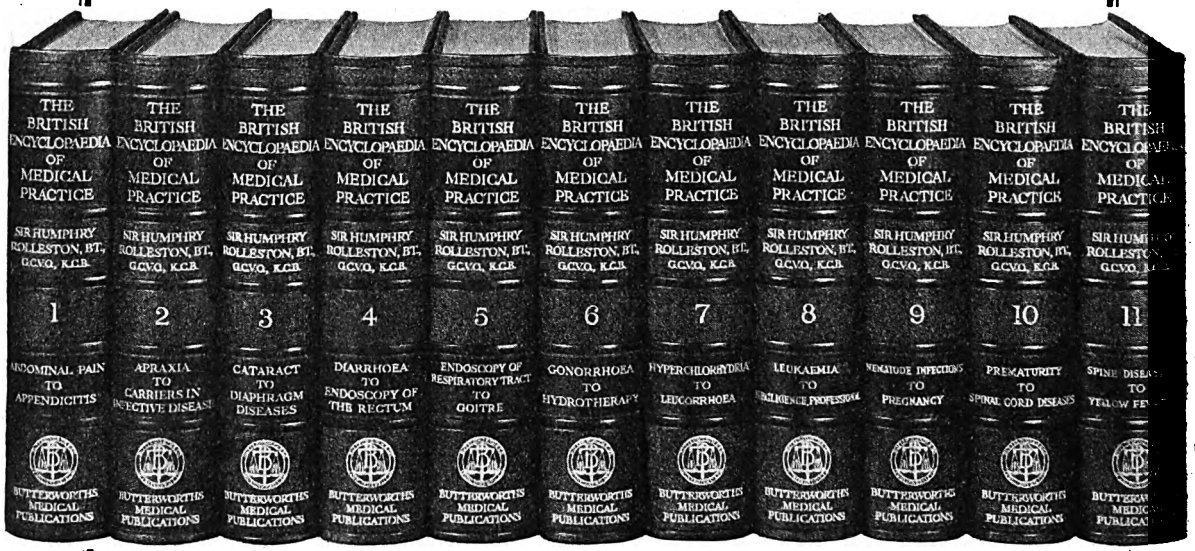

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Principles of MEDICAL STATISTICS

BY

A. BRADFORD HILL, D.Sc., Ph.D.

Reader in Epidemiology and Vital Statistics in the University of London (London School of Hygiene and Tropical Medicine); Fellow and Member of the Council of the Royal Statistical Society

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ANY assessment of success or failure in medicine which is based on fact rather than on opinion must nearly always be expressed in some numerical form—e.g., when the medical observer reports that he has treated so many cases with a favourable result in such and such a proportion, or the public health worker assesses the attack-rate on a population inoculated against some infection. We have reason to believe that there is now a steadily increasing demand among both clinical and public health workers for some knowledge of the elementary statistical technique, which will enable them to interpret figures or to analyse and test their meaning. Dr. Hill has succeeded in demonstrating clearly some of the ways in which investigations can be planned and figures derived from them can be analysed in order to yield fruitful results, choosing examples from medical publications to illustrate both the types of problems with which the medical worker is faced and the kinds of error he is most liable to make.

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ADDRESSES AND ORIGINAL ARTICLES

SURGICAL TREATMENT OF ANGINA PECTORIS AND ALLIED CONDITIONS

BY DANIEL T. DAVIES, M.D.Wales, F.R.C.P.Lond.
H. E. MANSELL, B.M. Oxon., F.R.C.P. Lond.
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With the coöperation of
VISCOUNT DAWSON OF PENN, P.C., M.D., B.Sc., P.R.C.P. Lond.
(*From the Cardiovascular Clinic, Lambeth Hospital, London County Council*)

THE experimental basis and technique of cardio-omentopexy was described a year ago in a special lecture at the Royal College of Surgeons of England which was introduced by Lord Dawson of Penn, honorary consultant to the Lambeth Cardiovascular Clinic, and published in this journal. The present paper contains an account of the further experiences of the clinic with cardio-omentopexy and other surgical means of supplementing a deficient coronary circulation.

In the Registrar-General's report for 1935 12,317 deaths are recorded from angina pectoris and coronary disease, and it seems probable that cardiac ischæmia played an important part in at least some of the enormous total of 70,504 deaths from myocardial disease. The total figure for carcinoma is 66,000.

The relation of coronary disease to sudden death has long been realised. Leyden, writing in the eighties, recognised the clear relation between degenerative changes in the myocardium and sclerosis of the coronary tree. Huchard agreed with Leyden, but by 1915 Sir Clifford Allbutt, while not denying the occasional existence of gross coronary obstruction as a cause of death, regarded angina as a symptom not of cardiac ischæmia but of some undefined type of nervous degeneration in the aortic plexus. To-day by common consent opinion has returned to the older view. On the clinical side Levine, in his clear and concise monograph, has grouped under the general heading of Angina Pectoris all the organic causes of cardiac ischæmia—coronary thrombosis, coronary sclerosis, and syphilitic aortitis—and he is emphatic that in fatal angina structural change is always present both in the myocardium and in the coronary tree. It is gradually being recognised that "chronic myocarditis" is a comparatively rare disease apart from cases of syphilitic or rheumatic origin, and that the greater proportion of cases so labelled, if carefully examined post mortem, show evidence of coronary disease.

Büchner, Weber, and Haager (1935) have published a careful record of 43 fatal cases of cardiac ischæmia in which the clinical findings are correlated with the post-mortem appearances both macroscopic and microscopic. They describe coronary thrombosis in an otherwise normal coronary tree, thrombosis complicating atheroma of the coronary arteries, hypertensive heart failure with gross atheroma of the tree but no gross obstruction, and syphilitic aortitis in which only the orifices of the vessels were affected. In every case the electrocardiograms were characteristic of cardiac ischæmia, and at autopsy careful examination of the heart revealed pathological changes in the myocardium. After obstruction of a main vessel, gross evidence of an old or recent infarct was invariably present; and where no actual block of the circuit was found but merely a general impairment of its lumen, scattered areas of recent necrosis or old fibrosis could always be detected in serial sections.

Under some conditions coronary occlusion is a fatal event, but the organism is often in a position to effect a remarkable degree of compensation; even successive attacks of coronary thrombosis may be survived and an astonishing degree of normal activity may be regained in the interval, sometimes years in extent, between the initial and the second attack. The mechanisms by which this natural compensation may be brought about have already been considered in previous papers. Although it is quite possible that there may be some subtle mechanism of which we know nothing, there are only two methods for the efficacy of which we have experimental and clinical evidence. One of these is anastomosis between the right and left coronary arteries, and the other is the process by which the heart may supplement its blood-supply from the parietes. The first mechanism is clearly of no avail when a diffuse sclerosis affects the entire coronary tree, and the second is only available if partial or complete destruction of the epicardium takes place so that adhesions may form between the heart and the parietal pericardium. After a coronary thrombosis only a small proportion of patients form adhesions between their infarct and the parietal pericardium, but this mode of compensation is important because it alone can be initiated or supplemented by surgery.

In a previous paper examples of the beneficial association of pericarditis with coronary disease were reviewed—Sternberg's classical case of "pericarditis epistenocardica," the histories cited by Mönckeberg, and also Sir Clifford Allbutt's doctor patient who returned to active practice after a severe attack of angina complicated by pericarditis. Chance has provided us with an excellent example of natural compensation in angina pectoris.

The father of one of our operated patients is now aged 68. For several years he suffered from angina for which he received the usual medical treatment. Three years ago he was suddenly seized by a more violent attack of pain in his chest than he had previously experienced, and in a state of collapse he was removed to hospital, where he passed some days in a critical state and grave doubts of his ultimate recovery were expressed. However, he recovered and after some weeks in bed returned home. He gradually resumed general activity and was amazed to find that his angina had disappeared. He remains free from pain and our interpretation of his recovery is that he suffered an attack of coronary thrombosis and adhesions formed with the parietes.

Moritz demonstrated by injection studies the vascularity of pericardial adhesions, and similar results have been obtained by one of us (H. E. M.) in the pathological department at Lambeth. In cases of pericarditis following coronary thrombosis it was possible to demonstrate vascular continuity between the coronary tree and the vessels of the parietal pericardium, the inferior sternopericardial ligament, and the diaphragm. It may be mentioned that the vascularity of the structures surrounding the heart in human beings appears to be much greater than in experimental animals.

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A review of the literature of coronary disease shows that methods of initiating or supplementing the collateral blood-supply to the heart are engaging the attention of physicians both in America and in Germany. Hochrein in his latest monograph (1937) states that "we have learnt to recognise that peri-

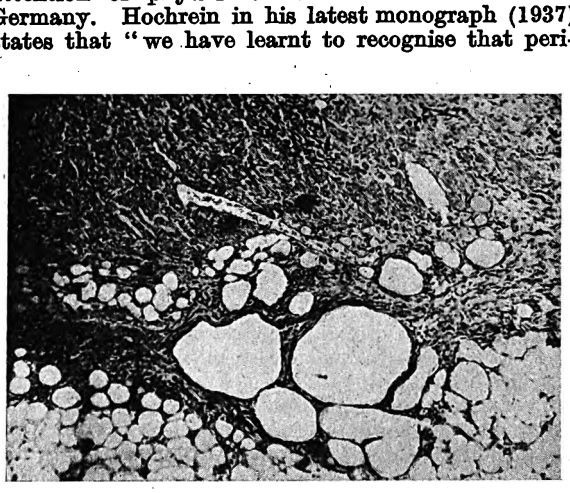

FIG. 1.—Section through junction between myocardium (above) and omentum (below) a week after operation. A primitive vessel is growing from the omentum into the heart muscle. (× 60.)

carditis is not a complication of coronary thrombosis but a natural attempt at healing—its presence is to be welcomed rather than deplored," and he goes on to discuss the theoretical possibility of encouraging the formation of pericardial adhesions when nature has failed to provide them. This theoretical possibility has been carried into practice in some of our cases with apparently beneficial results.

Experimental Basis of Cardio-omentopexy and Allied Operations

Experimental work on various methods of augmenting the blood-supply to the heart has been in progress at the Buckston Browne farm of the Royal College of Surgeons of England since April, 1933. The results previously obtained have been recorded in various publications, and a further paper containing details of modifications in technique is in preparation.

In animal experiments we have shown that an omental graft attached to the heart is compatible with the highest degree of physical exertion. One of our greyhounds completed a full course (525 yards) without distress after his recovery from two operations—at the first the descending branch of the left coronary artery was tied and at the second the graft was applied.

We have also shown that vascular connexions rapidly form between the graft and the myocardium, whether it is attached to normal muscle, to the site of a recent infarct, or to the site of an old fibrous infarct; this is important because these are the three conditions with which one might be confronted at operation. New vessels may be observed microscopically at the end of a week (Fig. 1), and at the end of three weeks complete injection of the coronary tree may be carried out from the graft with a suspension of indian ink. As time passes the vascular connexion increases and these injections may be made with barium paste (Fig. 2). The oldest specimen examined—that of a greyhound killed eighteen months after operation—showed that there was a marked increase in the normal mediastinal vessels and that these too had made connexions with the graft and with the myocardium. It is a fundamental point that cardio-omentopexy brings a new blood-supply to the heart from the abdominal aorta and also supplements the normal collaterals in the mediastinum and gives them access to the ischæmic heart. It is also important to realise that the graft forms direct connexions with the myocardium at its point of attachment and that its vessels anastomose with branches of the coronary tree, and therefore blood brought by the graft may be distributed to all parts of the heart. In other words, exact placing of the graft in relation to any localised area of ischæmia which it is desired to influence is not essential.

Lezius (1937) has shown that the lung can form extensive vascular adhesions with the heart when the fibrous pericardium is removed; he found that under these conditions he could ligature the descending branch of the left coronary artery without causing the usual infarct. In cardio-omentopexy the lung often adheres to the graft and probably assists in revascularisation, but we have so far only used cardio-pneumonopexy when the usual operation was impossible.

In the most recent of our laboratory experiments we have shown that the production of intrapericardial adhesions by the use of a special preparation—Aleuronat—provided us with an additional and simple means of revascularisation. In this way a route is afforded for revascularisation from the mediastinal vessels, but the method is inferior to cardio-omentopexy in that reinforcement of these vessels does not occur.

In our earlier experiments and operations the omental graft was always sutured to the heart; more recently we have been able to obtain equally firm attachment of the graft by suturing it to the pericardium only and applying aleuronat paste between the graft and the heart. We have also been able to demonstrate that the vascular continuity under these conditions is of the same order as when sutures are employed. This is technically important, for our experience has shown the danger of placing sutures in a friable and degenerate heart.

The Operations

Four types of operation were used in this series:

Cardio-omentopexy (Fig. 3) in which a left transpleural exposure of the heart is used, the pericardium is opened and a pedicled graft of the great omentum is brought through the diaphragm and attached to the heart.

Transpleural pericardiotomy in which the pericardium is opened after a left transpleural exposure, aleuronat paste is inserted and the pericardium is closed.

Extrapleural pericardiotomy in which the seventh costal cartilage and part of the xiphoid process are resected in Larrey's angle, the pericardium is opened and the sac treated with aleuronat.

Cardio-pneumonopexy (Lezius) in which after a left transpleural approach the pericardium is opened and a portion of lung is attached to the heart.

The Cases

The series consists of twenty cases. Patients were selected for operation who showed unequivocal evidence of cardiac ischæmia and who had failed to benefit by medical treatment. The majority were suffering from angina of effort. The aim of the operation in every case was to supplement the

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coronary circulation from without. The actual technique was modified to suit the individual patient and varied from complete cardio-omentopexy to simple pericardiotomy for insertion of the irritant aleuronat to encourage pericardial adhesions.

The cases will be considered in two groups—the first and larger group consisting of patients suffering from angina pectoris, the second and smaller group consisting of patients with other symptoms of cardiac ischæmia.

GROUP I: ANGINA PECTORIS

Of the fifteen members of this group (Table I) some were bedridden, others were in hospital, and the rest with one exception suffered from angina of effort of such degree as to curtial their ordinary activity. The exception is Case 13, in which the pain was not severe and was due to his previous coronary thrombosis, but in view of his age we considered operation justifiable.

CASE 1

A cosmopolitan of varying occupations, aged 65, was transferred to Lambeth Hospital on July 28th, 1936, from St. Stephen's Hospital (L.C.C.), where he had been admitted on July 7th after an attack of severe angina on the previous day. The pain had been most severe, lasting for four hours without relief from amyl nitrite and accompanied by much dyspnœa. He had had eight attacks during the previous four years, and from the first attack had limited his activities as far as possible. He was not normally breathless on exertion. He had had severe insomnia for the past six or eight months. He was a heavy smoker until three years ago. He gave a history of malaria and three laparotomies—for appendicitis, adhesions, and gastro-enterostomy. A paternal uncle had "dropped dead of angina."

Physical *examination* showed a grey-haired, well-nourished man with somewhat protruding eyes. His tongue was clean. There was no enlargement of the thyroid but slight tremor of the fingers. The radial artery was slightly tortuous but not thickened. The heart was not enlarged, the sounds were normal, and there was a soft apical systolic murmur. The blood pressure was 116 mm. systolic and 72 diastolic. The lungs were emphysematous. The abdomen showed three well-healed scars. The right pupil was larger than the left and the knee-jerks and ankle-jerks were not elicited. The urine was normal and the blood-urea 32 mg. per 100 c.cm. The Wassermann reaction was negative. X ray examination showed a large heart shadow. The basal metabolic rate was −40 per cent. The electrocardiogram showed the S–T interval raised and convex downwards in leads II and III.

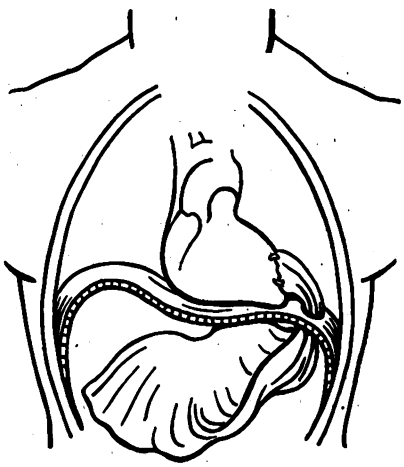

FIG. 3.—Diagram illustrating cardio-omentopexy in man.

Cardio-omentopexy was performed on August 17th. The heart was found to be free of pericardial adhesions. There was no difficulty in obtaining omentum in spite of three previous laparotomies. At the end of operation the upper left intercostal nerves were injected with 1 per cent. novocain. The pulse-rate was 96. Except for an immediate mild bronchitis recovery was uneventful. He was allowed up four weeks later and took his own discharge on Dec. 10th, the blood pressure being 160 mm. systolic and 90 diastolic. There were no further attacks of angina. Movement of the left diaphragm was seen for the first time 3½ months after operation. Serial electrocardiograms showed a gradual emergence of a Q wave in lead III.

Since leaving hospital he has been able to lead a life of normal activity without symptoms.

A B

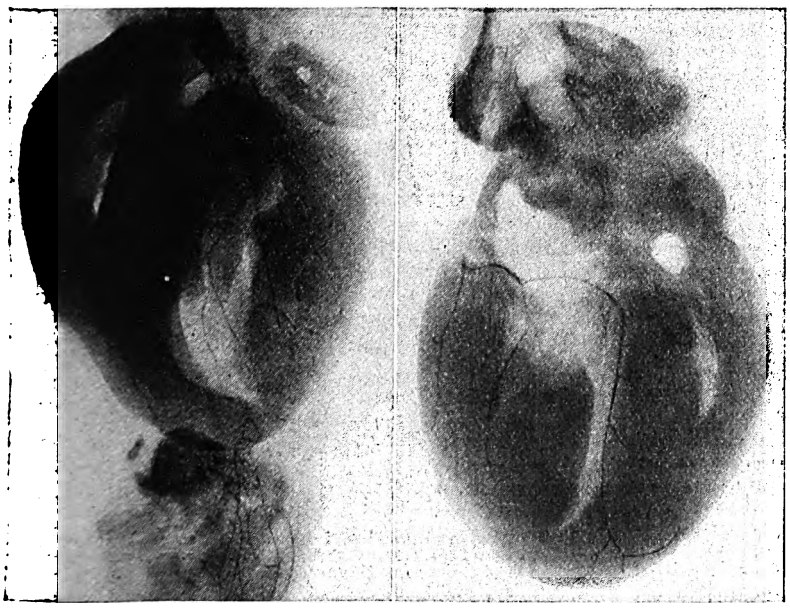

FIG. 2a.—Greyhound's heart injected with barium paste through the graft, eighteen months after cardio-omentopexy. Left side with graft attached.

FIG 2b.—Right side of the same heart.

CASE 2

A male, aged 71, who had retired from the Burma Police thirty years previously, was admitted to Lambeth Hospital from Dr. Dean Pollard of Bedford on July 31st, 1936, complaining of attacks of pain, beginning at the base of the neck and spreading over the heart and down the left arm. The first attack had occurred suddenly during exertion three years previously. They had become increasingly frequent—now almost daily—but not more severe. The pain was always related to exertion, emotion or, during sleep, to nightmare, and was relieved by nitroglycerin. He was not breathless on exertion between the attacks. He gave a history of appendicectomy in 1912.

Physical *examination* showed a well-nourished man of rather plethoric facies. His remaining teeth were septic. The radial arteries were tortuous and thickened. The size of the heart was masked by emphysema. The sounds were very distant but not spaced, and there was a soft systolic murmur at the apex. The blood pressure was 205 mm. systolic and 105 diastolic. Nothing abnormal was found in the lungs, abdomen, and central nervous system. The urine was normal and the blood-urea 44 mg. per 100 c.cm. The Wassermann

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TABLE I—CASES OF ANGINA PECTORIS

Case	Age.	Sex.	Diagnosis.	Operation.	Date.	Result.
1	65	M.	Angina of effort.	Cardio-omentopexy by suture only.	Aug. 17, 1936	Symptom-free.
2	72	M.	" "		Sept. 25 "	Died of uræmia three months later.
4	65	F.	Angina, hypertension, bundle-branch block.	Cardio-omentopexy by suture with insertion of aleuronat.	Oct. 16 "	Symptom-free.
5	60	M.	Angina of effort.		Jan. 22, 1937	" "
7	67	F.	" "	..	Feb. 26 "	Died on table.
8	56	M.	" "	Pericardiotomy for insertion of aleuronat.	Mar. 5 "	Symptom-free, at work.
9	50	M.	Coronary thrombosis, angina of effort.	Cardio-omentopexy with aleuronat only.	Mar. 12 "	" "
10	41	M.	Angina of effort.		April 16 "	Much improved, at work.
11	56	M.	" "		April 23 "	Improved, at work.
13	43	M.	Coronary thrombosis.		May 7 "	Symptom-free, at work.
14	56	M.	Angina of effort, auricular fibrillation.	Transpleural pericardiotomy for insertion of aleuronat.	May 28 "	Died two months later.
15	65	F.	Coronary thrombosis, angina of effort.	Cardio-omentopexy by suture only.	June 4 "	Much improved, discharged to convalescent home.
17	65	M.	Angina of effort.	Cardio-omentopexy with aleuronat only.	July 2 "	Died two months later.
18	62	F.	" "		July 2 "	" "
19	55	M.	" "	Pericardiotomy for insertion of aleuronat.	Aug. 25 "	Discharged from hospital, in statu quo.

reaction was negative. X ray examination showed that the heart was not enlarged. The electrocardiogram showed left axis-deviation, with inversion of the T waves in lead I. The S–T interval was depressed in lead I and raised in lead III.

While *in hospital* he had two attacks of angina: a mild attack in our presence while walking too fast, and a severe attack lasting six or seven minutes while straining at stool. On August 17th he developed acute tonsillitis and was sent home to recuperate on the 26th. He was readmitted on Sept. 23rd; he had a severe attack lasting twenty minutes on the station, after climbing a flight of 24 steps twice, and had to take two tablets of nitroglycerin before being able to proceed. On examination he looked fit and the throat was clear. The blood pressure was 208 mm. systolic and 118 diastolic. There were no basal râles and the urine was normal. The electrocardiogram showed no change.

Cardio-omentopexy was performed on Sept. 25th. The pericardium was tense, and the heart enlarged but free of adhesions. The pulse-rate at the end of operation was 72, and the blood pressure two hours later was 154 mm. systolic and 92 diastolic. The electrocardiogram showed no change.

He developed purulent bronchitis which lasted a week. On Oct. 4th he had two attacks of angina following visiting hours, the second needing an injection of morphia. There was a slight attack two days later. On Oct. 12th he had a severe attack (after being allowed up for two hours by mistake), only partially relieved by nitroglycerin and morphia and leaving numbness of the left arm. He subsequently became subject to frequent attacks of pain, occurring day and night and not related to exertion. The pain was relieved by nitroglycerin but not by an injection of sterile water. Attacks did not occur when his attention was occupied. He began to get up at the end of four weeks and was discharged home on Nov. 1st, showing no ill effects from a long car journey. His wife wrote on Nov. 30th: "He is immensely improved both mentally and physically, and I think that he improves slowly all the time. If it were not for occasional pains, he would be in perfect health." During the following week there was a return of severe pain and insomnia. The pain soon eased off, to be followed by breathlessness which became more and more distressing until Dec. 19th, when he was *readmitted* to Lambeth Hospital.

On examination he looked haggard and desperately ill. There was Cheyne-Stokes breathing, but in spite of the violence of the hyperpnœic phase he had no angina. The pulse was of fair volume and rate 100. The heart sounds were of very poor quality and there was gallop rhythm. The blood pressure was 140 mm. systolic and 100 diastolic. Râles were audible at the left base. There was no œdema but the urine was loaded with albumin. The tongue was dry and coated. The electrocardiogram showed much increase in voltage of the S waves in lead III and changes in the S–T interval in leads I and III. A diagnosis of uræmia was made. The blood-urea proved to be 116 mg. per 100 c.cm. and the blood calcium 10·4 mg. He improved

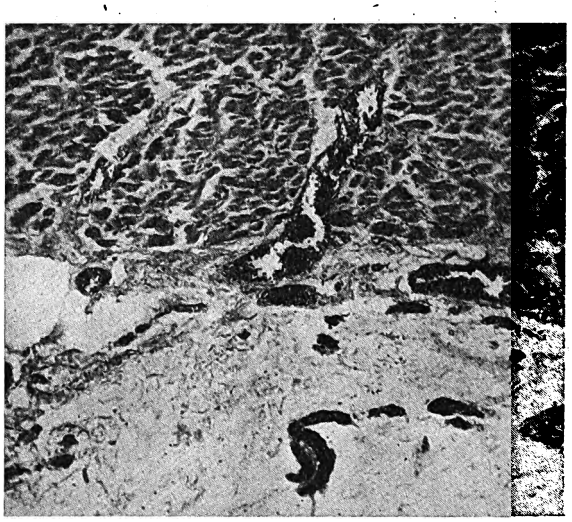

FIG. 4.—Section from Case 2 through junction between myocardium and omentum three months after operation. A vessel is seen entering the myocardium.

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for a few days with treatment but changed suddenly for the worse on Dec. 27th and died that night.

Post-mortem examination showed the operation wound to be firmly healed and there had been complete restitution of the thoracic cage. The graft was firmly attached to the heart, which was removed for injection. The right pleural cavity contained free fluid in excess but the lung was normal. The lower lobe of the left lung was collapsed. The abdomen contained an excess of free fluid, but the viscera, including the colon, were normal, and the graft could be seen in place passing through the diaphragm. The kidneys showed chronic interstitial nephritis and there was advanced atheroma of the abdominal aorta. Injection of the graft with a watery suspension of indian ink was carried out from the abdominal aorta, after removal from the body. A pressure of 100 mm. of mercury was used, and the technique was identical with that employed in the experimental series. A very profuse injection of the parietal pericardium was obtained, and the ink eventually reached the chambers of the heart. The specimen was fixed in formalin, and on section it was possible to see ink lying in the myocardium. Stained sections showed new vessels running from the omentum into the myocardium (Fig. 4). There was diffuse sclerosis of the coronary tree, the lumen being obliterated at one point on the left descending branch, but there was no actual infarction of the myocardium.

CASE 4

A missionary's widow, aged 65, was admitted to Lambeth Hospital from Dr. Lyne of Hove on Oct. 1st, 1936, with a history of angina of twelve years' duration. It had formerly been relieved by amyl nitrite but now needed Omnopon. Attacks were often occurring at night, or in the early morning if she had become overtired the evening before. She had been practically confined to bed for eighteen months past and was unable now to wash herself. She was also liable to attacks of rapid and irregular pulse, lasting about half an hour and causing considerable distress at the time. She also complained of headache and a bursting feeling in the head. She had led an exceptionally adventurous and strenuous life, often at high altitudes. She had had pleurisy several times, and pneumonia eight years ago. There is a family history of pulmonary tuberculosis. A sister died of a stroke and another has angina.

On *examination* she was obese. The teeth were well stopped, the throat clear. The apex-beat was in the 5th intercostal space in the anterior axillary line. The mitral first sound was very low and the aortic second sound accentuated and ringing. There was a very soft to-and-fro murmur at the apex and in the aortic area. The blood pressure was 247 mm. systolic and 117 diastolic. Nothing abnormal was found in the chest and abdomen. The knee-jerks and ankle-jerks were not obtained. There was no œdema and the urine was normal. The Wassermann reaction was negative. X ray examination showed a large heart. The electrocardiogram showed a right (old terminology) bundle-branch block, with very large amplitude of the Q R S complexes in leads I and III. (The bundle block was known to have been present in 1930.) She was treated for fourteen days with a starch-free diet, general massage, and sedative drugs.

Cardio-omentopexy was performed on Oct. 16th. The inferior sternopericardial ligament was fatty and well marked. A large fatty graft was secured and sutured to the heart, which was free of adhesions, aleuronat in addition being inserted. At the end of operation the pulse-rate was 69 and the blood pressure 170 mm. systolic and 90 diastolic. Recovery was interrupted by a paroxysm of auricular fibrillation, which began 30 hours afterwards and ceased spontaneously 9½ hours later. It was accompanied at the onset by severe angina. There was a moderate rise of evening temperature for four days. Two anginal attacks occurred in the first fortnight and none subsequently. General massage was restarted after five weeks and she was allowed to wash herself. In six weeks the blood pressure had returned to 240 mm. systolic and 112 diastolic. On Christmas Day, ten weeks after operation, she was up and about the ward for two hours without ill effects. During January she had some further attacks of paroxysmal fibrillation accompanied by pain. They ceased as soon as she was put on quinidine. She was transferred to St. Benedict's Hospital for convalescence on Feb. 3rd, sixteen weeks after operation. The blood pressure was 230 mm. systolic and 116 diastolic; the electrocardiogram showed no change and there were still signs of collapse at the left base.

She was discharged from St. Benedict's Hospital on March 18th and has gradually regained her activity. There have been no more attacks of angina. There was a brief return of auricular fibrillation in June when she had been overdoing things, but it responded at once to quinidine. Eight months after operation X ray examination

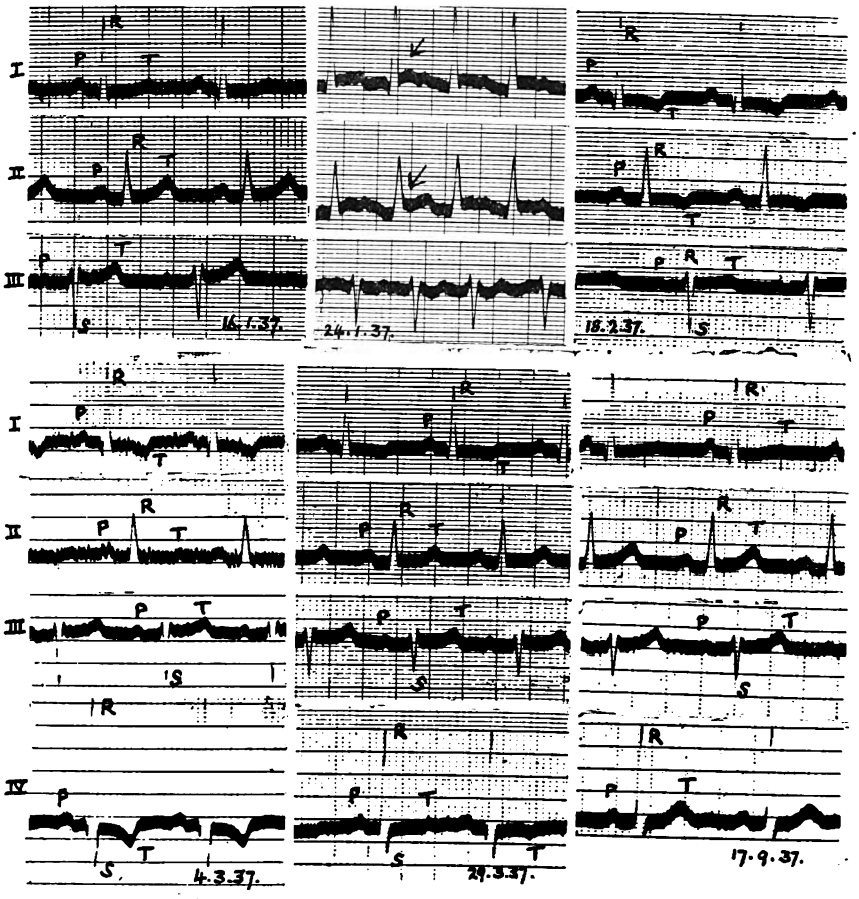

FIG. 5.—Serial electrocardiograms taken in Case 5. Cardio-omentopexy with insertion of aleuronat was performed on Jan. 22nd.

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showed the left diaphragm moving synchronously with the right, and there were no longer signs of collapse at the left base. She is now leading a life of activity normal for her age without any pain.

CASE 5

An engineer, aged 60, was admitted to Lambeth Hospital on Jan. 12th, 1937, with a four years' history of angina pectoris. Attacks had gradually increased in frequency and during the past few months had made his life unbearable. They had occurred occasionally in bed. Pain was relieved by nitroglycerin. He had led a very active life, chiefly in the tropics for the last thirty years. He was a strong man, well known for weight-lifting and wrestling, a big spirit-drinker and heavy smoker. There was no family history of angina.

Physical *examination* showed a well-developed man of height 5 ft. 8½ in. and weight 13½ st. There was no evident arterio-sclerosis. The heart was not enlarged, the mitral first sound was accentuated and low-pitched, the aortic second sound clear, and there were no murmurs. Nothing abnormal was found in the chest, abdomen, and central nervous system. There was a small left inguinal hernia. The urine was normal and the blood-urea 32 mg. per 100 c.cm. The Wassermann reaction was negative. X ray examination showed no enlargement of the heart. The electrocardiogram showed left axis-deviation and low T waves in lead I.

Cardio-omentopexy was performed on Jan. 22nd. The omentum was easily obtained, but some difficulty was met in getting enough without bringing the stomach with it. The heart was not enlarged and was free of adhesions. Aleuronat was applied and the graft was sutured to the heart and pericardium. The pulse-rate at the end of operation was 108 and the blood pressure 140 mm. systolic and 85 diastolic. He developed mild purulent bronchitis and fever lasting a fortnight. During the first week he had several paroxysms of auricular fibrillation, but these were readily controlled by quinidine. During the second week he developed signs and X ray evidence of a small left pleural effusion. At the end of a fortnight he had an attack of angina, and in less than a month he was getting attacks as often as before the operation. They were relieved by nitroglycerin. He was allowed up at the end of four weeks, and was transferred to Sidcup for convalescence on March 30th, his blood pressure being 156 mm. systolic and 96 diastolic. Serial electrocardiograms (Fig. 5) showed inversion of the T waves in leads I, II, and IV, most marked between the fourth and sixth weeks after operation.

Attacks of pain became gradually less frequent and the consumption of nitroglycerin tablets less, but it was seven months before he reported himself symptom-free. Before operation five stairs were all he could manage. He now climbs sixty to his room without pain or distress. In November he successfully underwent radical herniotomy under general anæsthesia.

CASE 7

A widow, aged 67, was admitted to Lambeth Hospital on Feb. 5th, 1937, at her own request, complaining of angina pectoris of two years' duration. The attacks were frequent and severe, and she could not even put on her shoes without inducing pain. Nitroglycerin gave her short-lived relief. Against her family's wishes she desired operation, even if it were to prove fatal. Ten years ago she had been treated in Bethnal Green Hospital for hypertension. Two years ago she had a stroke with left hemiplegia. There was a history of pleurisy as a young woman. Her mother died of "aneurysm of the heart."

Physical *examination* showed a well-nourished, grey-haired woman. The brachial arteries were full and elastic. The apex-beat was in the 5th intercostal space, 4½ in. out. The cardiac impulse was heaving. The mitral first sound was low-pitched and the sounds rather spaced. A systolic murmur was audible in all areas and maximal in the pulmonary area. The blood pressure was 200 mm. systolic and 118 diastolic. There were râles at the bases. The abdomen was normal. The right pupil was smaller than the left and did not react, and the ankle-jerks were not obtained. There was very slight œdema over the tibiæ. The urine and kidney function tests were normal and the blood-urea 36 mg. per 100 c.cm. The Wassermann reaction was negative. X ray examination showed the right diaphragm raised but moving normally. The heart was not enlarged. The electrocardiogram showed well-marked Q waves and flat T waves in lead III. Operation was postponed for a week owing to slight coryza but was then undertaken at her urgent request.

Thoracotomy was performed on Feb. 26th and the phrenic nerve crushed. A good graft was secured and the edge of it was sutured to a well-marked and vascular sternopericardial ligament. The pericardium was opened easily, there being no tension and no adhesions. The anterior descending branch of the left coronary was much more exposed than usual and was tortuous but not calcified. The first myocardial suture was inserted to the right of this vessel without incident, although a clear view of the myocardium was obscured by subepicardial fat. A second suture was inserted and immediately bleeding was observed. The suture was at once tied, with the result that much more violent hæmorrhage occurred. It now become obvious that the wall of the right ventricle had been torn, and the bleeding point was seized with a Moynihan forceps, which tore through, leaving a large gaping wound in the ventricular wall. Three fingers of the operator's left hand were inserted into the defect so that hæmorrhage was controlled. Chordæ tendineæ were clearly felt in the ventricular cavity. One assistant then enlarged the intercostal incision, while the other opened the pericardium widely. The heart was now completely delivered from the wound, and while venous return was controlled by manual compression of the cavæ the large rent was repaired by interrupted sutures, supplemented by free muscle graft; and in addition a smaller rent on the posterior wall of the right ventricle was repaired in a similar manner. The heart was returned, the cavæ released, and at once a small tear was apparent in the wall of the right auricle. The heart was again delivered, the cavæ again controlled, and this tear repaired. The heart was replaced and was seen to fill with blood without hæmorrhage. During the whole manœuvre the total amount of blood lost was small, and the auricles were observed to be contracting again rhythmically. Cardiac massage and intracardiac adrenaline failed to restore ventricular action. The estimated duration of caval compression was 3½ and 1½ minutes.

At *post-mortem examination* the brain showed an area of old softening in the upper aspect of the posterior part of the right frontal lobe, and there was severe atheroma of the cerebral arteries. The heart weighed 10 oz., and the myocardium very friable. There were two tears in the ventricular wall, both sutured and one also plugged with a portion of voluntary muscle, and there was a subpericardial hæmatoma over the left auricle close to a sutured rent in the coronary sinus. Severe coronary atheroma was present. There was considerable atheroma of the lower abdominal aorta. The lungs were congested and showed basal collapse, especially on the left side. The kidneys and their vessels appeared normal.

CASE 8

A machine-hand, aged 56, was admitted to Lambeth Hospital from Dr. W. G. Watson on Feb. 20th, 1937, complaining of shortness of breath for eighteen months and pain over the heart, on exertion only, for six months. The pain lasted about two minutes and radiated into the left arm; it was never agonising, had never occurred at rest, and was more likely to occur after a heavy meal. There were no other symptoms. There were no previous illnesses and he was passed A1 in the war. There was no history of angina in the family.

Physical *examination* showed a well-nourished man with a high colour. The tongue was moist and clean and his teeth had all been extracted about three years before for neuralgia. The heart was not enlarged, the aortic second sound was thin and sharp, and there was a systolic murmur at the apex. Frequent extrasystoles were present. There was moderate radial and brachial arterio-sclerosis, and the blood pressure was 150–130 mm. systolic and 75 diastolic. Nothing abnormal was found in the abdomen and central nervous system. There was very slight

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pitting over the left tibia. The urine and kidney function tests were normal and the blood-urea 28 mg. per 100 c.cm. The Wassermann reaction was negative. X ray examination showed a long thorax, with nothing abnormal in the heart, lungs, or aorta. The electrocardiogram showed some slurring of S in all leads and numerous premature ventricular contractions. He was diagnosed as an early case of angina pectoris.

Operation was performed on March 5th, the pericardium being opened via Larrey's angle and aleuronat being

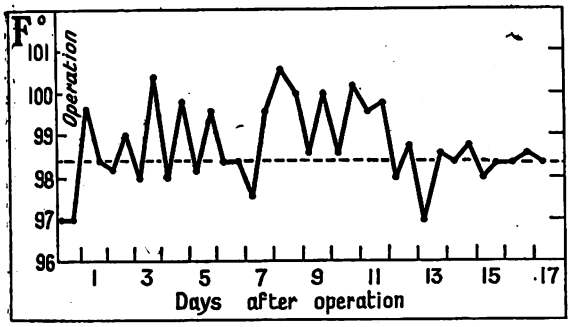

FIG. 6.—Temperature chart showing aleuronat reaction.

inserted. There was pyrexia (Fig. 6) for eleven days and the extrasystoles became more numerous. A soft pericardial rub was heard and X ray examination suggested a small pericardial effusion. He was allowed up after three weeks and discharged home on April 6th. He had had no pain since the operation but extrasystoles were still present. The electrocardiogram showed marked elevation of the S–T interval, especially in lead II, during the first week, and this was followed at the end of three weeks by flattening or inversion of the T waves in all leads. Three months after operation the T waves had returned to normal in leads I and II but remained inverted in lead III.

There has been no pain since operation. He complained of some breathlessness on exertion for the first three months but is now symptom-free and back at work.

CASE 9

A secretary, aged 50, was admitted to Lambeth Hospital on March 7th with a history of anginal attacks for four years. Two attacks had been particularly severe: one eighteen months before, when the pain had occurred at rest and lasted 48 hours and he was in bed for three weeks; and the other four weeks before admission, when the pain again came on during rest, lasted 24 hours, and he was in bed for two days. An attack was "always hanging about," and his activity was greatly curtailed. Amyl nitrite had given some relief. He had been compelled to move into a bungalow to avoid stairs and had given up driving a car. His previous history was negative, except for influenza in 1918. His father had one stroke before he died of chest trouble, and his mother died of a stroke. A maternal uncle died suddenly of a severe pain in the chest.

Physical *examination* showed an obese man, 5 ft. 4½ in. in height and weighing 12 st. 4 lb. The heart was not enlarged, the sounds were normal, and there were no murmurs. The blood pressure was 140 mm. systolic and 100 diastolic, and there was no arterio-sclerosis. Nothing abnormal was found in the chest, abdomen, and central nervous system. The urine and kidney function tests were normal and his blood-urea was 36 mg. per 100 c.cm. The Wassermann reaction was negative. X ray examination showed an enlarged heart. The electrocardiogram revealed well-marked Q deflections, with inversion of the T waves in lead III and low T waves in lead II. Lead IV was normal. The findings suggested an old coronary thrombosis of T_3 type.

Cardio-omentopexy was carried out on March 12th. Owing to a very large amount of pericardial fat the phrenic nerve was not seen, but it was crushed successfully and a large fat omental graft was obtained. There were no pericardial adhesions. Aleuronat was used, and the graft was not sutured to the heart but only to the pericardium. The blood pressure three hours after operation was 130 mm. systolic and 88 diastolic. He developed a mild purulent bronchitis. Pyrexia lasted for a fortnight, due partly to a quinsy which arose during the second week. X ray examination on the fourth day suggested a small pericardial effusion. Serial electrocardiograms showed that the T waves became inverted in leads I and II and subsequently recovered. He was allowed up at the end of four weeks and was discharged home on April 17th, his blood pressure being 155 mm. systolic and 110 diastolic.

He is now symptom-free and has had no angina since the operation. He has moved into a larger house and is driving a car again.

CASE 10

A shipping messenger, aged 41, was admitted to Lambeth Hospital from Dr. A. W. Holthusen of Westcliff on April 10th, 1937, complaining of attacks of angina since July, 1935. The pain "gripped him like a vice" and radiated down both arms. It was brought on by exertion, and had begun, with increasing frequency, to awaken him at night. He could walk no further than 100 yards and needed 48 nitroglycerin tablets a week. He had had no previous illnesses. His father had suffered from angina but had had no attacks subsequent to a severe attack of probably coronary thrombosis on May 20th, 1933.

Physical *examination* showed a big man of rather flabby musculature. His tongue was coated. The heart was not enlarged and there were no murmurs. The aortic second sound was accentuated. The radial and brachial arteries were somewhat tortuous and the blood pressure was 184 mm. systolic and 110 diastolic. Nothing abnormal was found in the chest, abdomen, and central nervous system. There was no œdema. The urine and kidney function tests were normal. The blood-urea was 44 mg. per 100 c.cm. The Wassermann reaction was negative. X ray examination showed heavy hilar shadows and an increase of the heart shadow to the right. The electrocardiogram was of large amplitude and showed notched Q deflections in lead III. The T waves were low in lead I, flat in lead II, and diphasic in lead III, and there was depression of the S–T interval in leads I and II.

Cardio-omentopexy was performed on April 16th. There were some pleural adhesions. The heart was large, the pericardium tense but free, and there was a well-marked inferior sternopericardial ligament. A considerable amount of aleuronat was inserted, and the graft was sutured to the pericardium but not to the heart. The blood pressure at the end of operation was 112 mm. systolic and 70 diastolic. During the night the pulse-rate rose to 144 and the systolic blood pressure the next morning was only 68. Febrile reaction lasted over a week and leucocytosis reached 25,600 per c.mm. A soft pericardial rub was heard on the third day. On the sixth day his general condition and the physical signs suggested a left hæmothorax, and this was confirmed by paracentesis and X ray examination. Convalescence was slow. He was allowed up at the end of six weeks and was discharged home on May 29th. The electrocardiogram during the first week showed marked depression of the S–T interval in lead I and elevation in lead III.

Fourteen weeks after operation he looked well but was getting mild anginal attacks both on exertion and at rest. The heart sounds were tic-tac and a definite gallop rhythm was present. The blood pressure was 168 mm. systolic and 100 diastolic. A month later the gallop rhythm had disappeared but the heart sounds were still tic-tac. He returned to light work on Sept. 30th, five and a half months after operation. He is now getting no serious pain and can climb the 72 stairs to his office without pain or distress. The heart sounds are of good quality and the blood pressure 155 mm. systolic and 105 diastolic. The left diaphragm still shows paradoxical movement.

CASE 11

A tool-maker, aged 56, was admitted to Lambeth Hospital from Dr. F. B. Mallinson on Feb. 20th, 1937, with a history of angina pectoris for four years. Attacks were becoming more frequent and might stop him three or

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four times during his twenty minutes' walk to the station. He had had pleurisy twenty years ago and renal colic three years later, when he passed three small stones. He had been a non-smoker since the age of 19 and was a total abstainer. There was no family history of angina.

On *examination* he appeared a well-nourished, grey-haired man. The apex-beat was in the 5th intercostal space, 4½ in. out, and the cardiac impulse was heaving. The aortic second sound was thin and there was a soft systolic murmur at the apex. The arteries were not thickened and the blood pressure was 140 mm. systolic and 70 diastolic. Nothing abnormal was found in the chest and abdomen. The ankle-jerks were not obtained. There was no œdema, the urine and kidney function tests were normal, and the blood-urea 32 mg. per 100 c.cm. The Wassermann reaction was negative. X ray examination showed very heavy hilar shadows and moderate enlargement of the heart. The electrocardiogram showed left axis-deviation, with notching of the S deflections in lead III. The T waves were inverted in lead I (in June, 1935, they were known to have been upright).

He was discharged home for domestic reasons on Feb. 28th and was readmitted on April 20th. He had been working hard without severe pain, but the exertion of the journey (carrying a light suitcase half a mile) brought him to a standstill with quite a severe attack. The electrocardiogram showed small R and notched S deflections in lead IV.

Cardio-pneumonopexy was carried out on April 23rd, omentopexy being prevented by numerous fine adhesions between lung and mediastinum. The phrenic nerve was crushed. The pericardium was not tense, the heart free, slightly enlarged, and yellowish in colour. The lower part of the left upper lobe and the upper part of the lower lobe were sutured to the cut edge of the pericardium, after insertion of aleuronat. The blood pressure at the end of operation was 125 mm. systolic and 75 diastolic. Recovery was uneventful, with moderate pyrexia and leucocytosis. He was allowed up at the end of four weeks and was discharged home on June 9th, having had no further attacks of angina. His blood pressure was 144 mm. systolic and 84 diastolic. The electrocardiogram had shown increasing inversion of the T waves in leads I and II.

He improved at first at home and only had one attack during June, but by the end of August he was complaining of attacks as frequent as before operation and exactly similar, except that instead of stopping he could get rid of the pain by increasing his pace. He was readmitted and spontaneous pneumothorax was excluded by X ray examination. The electrocardiogram showed considerable increase of voltage, with recovery of the T waves except in lead I. The S deflections in lead IV still showed notching. He now reports that he is hard at work, but still unable to walk far without anginal pain.

CASE 13

A printer, aged 43, was admitted to Lambeth Hospital from Dr. G. A. Shepherd on April 13th, 1937, with the story that he had collapsed unconscious in his office on Jan. 21st. For a week previously he had complained of pain behind the breast-bone and two days before he had been awakened by an attack of palpitation which lasted four hours and frightened him considerably. He was treated in bed for a week and then sent to the seaside, where he complained of pain in the chest on exertion. Nearly a month after the attack he was seen by a cardiologist, who diagnosed it as coronary thrombosis and advised four weeks in a nursing-home at complete rest, followed by four weeks' restful holiday. During this period his weight was reduced from 15 st. 6 lb. to 13 st. 5 lb., and he complained of occasional attacks of pain. His previous health had always been good and there was no history of angina in the family.

On *examination* he was well nourished and appeared apprehensive and highly strung. The heart was not enlarged, the sounds were normal, and there were no murmurs. The arteries were not thickened and the blood pressure was 144 mm. systolic and 90 diastolic (compared with 130 mm. systolic and 90 diastolic in February, 1937). The chest moved rather poorly but was otherwise normal, and nothing abnormal was found in the abdomen. The tendon reflexes were exaggerated. The urine and kidney function tests were normal and the blood-urea was 24 mg. per 100 c.cm. The Wassermann reaction was negative. X ray examination showed very slight enlargement of the heart. The electrocardiogram showed well-marked Q deflections, with inversion of the T waves in lead III and low T waves in lead II. The S–T interval was rising in lead I and raised and falling in lead III. Lead IV was normal. The findings were compatible with a healing cardiac infarction of T_3 type. He was treated for a fortnight before operation with a balanced diet, breathing exercises, and a sedative mixture.

Cardio-omentopexy was performed on May 7th. The phrenic nerve was crushed and a good fatty graft obtained. The heart was large, the pericardium not tense and free of adhesions, and the myocardium fatty and greyish-yellow in colour. Aleuronat was used and the graft sutured to the pericardium only. The blood pressure at the end of operation was 110 mm. systolic and 68 diastolic. Recovery was uneventful. Pyrexia lasted for fourteen days and leucocytosis reached 21,200 per c.mm. He was allowed up at the end of four weeks and was discharged home on June 19th, the blood pressure being 120 mm. systolic and 88 diastolic. The electrocardiogram underwent no material change.

For the first three months after discharge he complained of some breathlessness on exertion, and had four attacks of mild retrosternal pain, and on examination his heart sounds were tic-tac. He is now free of symptoms and back at work, but still taking life rather more easily than he need. His heart sounds are normal and the blood pressure 130 mm. systolic and 94 diastolic. The left diaphragm has recovered its tone and movement. In the electrocardiogram Q waves and inversion of the T waves are still present in lead III, but the S-T interval is now normal in leads I and III.

CASE 14

A french-polisher, aged 56, was admitted to the London Jewish Hospital on April 9th, 1937, with a three months' history of angina pectoris. The first attack had occurred on walking, and at the time of admission they were coming on every three or four hours. The pain was very severe but was relieved by three nitroglycerin tablets. In hospital the attacks became fewer and milder. He was transferred to Lambeth Hospital on May 14th. He gave a history of influenzal pneumonia in 1918, broncho-pneumonia six or seven years ago, and winter bronchitis for many years. There was no history of angina or other cardiovascular disease in his family.

Physical *examination* showed a well-nourished, freckled man, 5 ft. 5 in. in height. He was confined to bed but was able to wash himself. Attacks were far less frequent and pain was now relieved by half a tablet of nitroglycerin. The apex-beat was in the 5th intercostal space, 4 in. from the midline. The mitral first sound was accentuated and the aortic second sound thin. There were no murmurs. Auricular fibrillation was present, the ventricular rate being 100 per min. There was no arterio-sclerosis and the blood pressure was 130 mm. systolic and 80 diastolic. The chest moved poorly but the lungs were normal. The abdomen was soft and rotund and the central nervous system normal. There was no œdema. The urine contained a trace of albumin. The blood-urea was 28 mg. per 100 c.cm. and the kidney function tests were satisfactory. The blood showed polycythæmia and gave a negative Wassermann reaction. X ray examination showed a large triangular heart shadow. The electrocardiogram showed auricular fibrillation, left axis-deviation, and notching of the Q R S complexes. The main deflection in lead IV was negative and notched. He was treated with Luminal and a venesection of one pint.

Thoracotomy was performed on May 28th. The pulse-rate rose to 160 as soon as the chest was opened, so aleuronat was inserted into the pericardium and the operation terminated. The pericardium was not tense. The heart was greyish-yellow in colour and free of adhesions.

Recovery from the actual operation was fairly uneventful. He was afebrile for a week, and then ran a mild irregular temperature for the next month, probably due to a small

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pleural effusion which developed at the left base. Leucocytosis reached 14,400 per c.mm. on the third day. On the ninth day his mental state became slightly confused and never quite regained normality afterwards. By July 5th, five and a half weeks after operation, he was sitting up in the evenings and able to take a few steps round the room. He had had no further attacks of angina. Five days later he became suddenly blue and dyspnœic and mentally more depressed. Severe pleuritic pain developed on the right side, the sputum became blood-stained, and signs of pulmonary infarction were found at the right base. His condition rapidly deteriorated, thrombosis of the right femoral vein occurred on July 19th, and he died the following day.

There was no post-mortem examination.

CASE 15

A widow, aged 65, was transferred to Lambeth Hospital on April 9th, 1937, from Lewisham Hospital (L.C.C.), where she had been admitted on July 28th, 1936, for a coronary thrombosis of T_3 type occurring that day. Before the attack she had complained of breathlessness on exertion for six years and for five years attacks of precordial pain brought on by exertion as trivial as sewing. Since the occlusion she had remained confined to bed and had complained of a persistent feeling of constriction round the heart, with exacerbations of pain needing morphia. She gave a history of several pelvic operations, and Mr. Cecil Joll had removed a goitre 20 years ago. She had had winter bronchitis of late years and was subject to laryngitis. Her father had dropped dead of heart trouble.

Physical *examination* showed an obese woman, confined to bed and becoming easily dyspnœic on slight exertion. The heart showed accentuation of the first sound and a systolic murmur audible at the apex and in the aortic area. The blood pressure was 154 mm. systolic and 90 diastolic. There were râles at the right base. The abdomen was normal. She complained of paræsthesiæ in the arms, and there was diminished sensibility to pinprick and cotton-wool. The urine and kidney function tests were normal and the blood-urea was 28 mg. per 100 c.cm. The Wassermann reaction was negative. X ray examination showed enlargement of the cardiac shadow to the right, ? aneurysmal. The electrocardiogram showed left axis-deviation. The T waves were still inverted in lead III but the S-T interval was now normal.

A month after admission she had an attack of severe constricting pain round the heart and lost consciousness for about two minutes. Her pulse and colour were very poor at the time but she recovered well. Attempts were made to activate her but even the exertion of getting out of bed brought on an attack of pain.

Cardio-omentopexy was performed on June 4th. The phrenic nerve was crushed and a fatty omental graft easily obtained. The inferior sternopericardial ligament was well marked. The pericardium was fatty and rather tense over a slightly enlarged heart. The heart was free and showed no evidence of infarction. The graft was sutured to the heart without aleuronat. The pulse-rate at the end of operation was 80 and the blood pressure 105 mm. systolic and 68 diastolic. She developed a painful non-productive cough with much bronchial spasm, and dyspnœa and cyanosis on movement, but no signs of consolidation were found. The blood pressure had returned to its pre-operative level within a week. Dyspnœa on exertion persisted for about a month. The electrocardiogram showed flattening of the T waves in leads I and II on the tenth day but recovery to normal in three weeks. Activation was begun seven weeks after operation and she sat out of bed at the end of two months for the first time for over a year. She still complained of an occasional feeling of heaviness across the chest but no anginal attacks. She was transferred to St. Benedict's Hospital for convalescence on Oct. 22nd, having lost 1 st. by dieting.

She now reports that she is up and about the ward three or four hours a day without symptoms.

CASE 17

A traveller, aged 65, was admitted to Lambeth Hospital on June 29th, 1937, with a history of angina pectoris for a year. Attacks had become so frequent, even occurring at rest, that in January, 1937, he had been admitted to hospital for treatment by paravertebral alcohol nerve-block. He had had no pain since, but was now complaining of increasing breathlessness on exertion and was unable even to shave himself. There was no history of previous illness and no family history of angina.

On *examination* he appeared a florid, grey-haired man. The heart was not enlarged clinically, the sounds were rather toneless, and there were no murmurs. Moderate arterio-sclerosis was present and the blood pressure was 132 mm. systolic and 88 diastolic. There were râles at both bases. The vital capacity was 1900 c.cm. and the chest expansion 1 in. The liver was just palpable but not tender. The knee-jerks were not obtained. The urine contained a trace of albumin. The blood-urea was 40 mg. per 100 c.cm. and the urea-concentration test 2·1 per cent. and 2·6 per cent. The Wassermann reaction was negative. X ray examination showed enlargement of the heart. The electrocardiogram showed left axis-deviation and notching of the Q R S complexes. The T waves were inverted in lead I and low in lead II. The main deflection in lead IV was negative.

Cardio-omentopexy was performed on July 2nd. The phrenic nerve was crushed but the diaphragm did not rise so high or so dramatically as usual. The pericardium was tense but free of adhesions. Aleuronat only was used for application of the graft, and the inferior sterno-pericardial ligament and lung fell nicely into apposition. The latter was unusually large, voluminous, and tough. The pulse-rate at the end of operation was 96 and the blood pressure 72 mm. systolic and 52 diastolic.

His condition was satisfactory until the fourth day, when signs of consolidation of the left lower lobe developed. On the seventh day a slight purulent discharge began from the sternal end of the wound; this proved ultimately to be due to necrosis of the 6th costal cartilage. The pneumonia ran a satisfactory course until July 20th, when he became lethargic and on examination showed a dry tongue, pulse less good, consolidated left lower lobe, enlarged and tender liver, slight œdema of the ankles and lumbar region, and much albuminuria. The blood pressure was 114 mm. systolic and 78 diastolic. The blood-urea was 68 mg. per 100 c.cm. In four days all œdema had disappeared but he remained drowsy. Two days later an empyema burst through the outer end of his wound and his mental condition improved at once. A hæmolytic streptococcus was isolated from the pus and 5 c.cm. of Prontosil Soluble was injected on two occasions into the empyema cavity. He seemed to be improving slowly, but necrosis of the costal cartilage was progressive and on August 22nd his pulse was noted *for the first time* as being less good. He died suddenly in his sleep three days later, 7½ weeks after operation.

At *post-mortem examination* the operation wound was found to have healed except for two large sinuses; one at the sternal end exposed the 6th costal cartilage, which was ununited to its rib and in a condition of necrosis; the other led backwards into the axilla to a sinus entering the pleural cavity. The heart was rather small and the myocardium soft and fibrotic. Both coronaries were calcified for the first 2 in. of their course, and their lumina were almost completely obliterated. There was one small superficial adhesion high up over the left ventricle and a dense tubular adhesion to the anterior aspect of the apex. This corresponded outside the pericardium to a densely adherent mass consisting of fatty inferior sterno-pericardial ligament, portion of left lung, left dome of diaphragm, and thoracic end of the graft. There was a small empyema cavity, empty of pus, over the lower half of the left lower lobe. The upper lobe of the left lung was normal. Its lower lobe was collapsed and the cut surface showed thickened and dilated bronchioles protruding from the retracted lung parenchyma. The right lung showed basal congestion and œdema. The aorta showed diffuse early atheroma. In the abdomen the omental graft passed through the left leaf of the diaphragm near its lateral attachment. The liver was fatty and the spleen toxic and diffluent. The kidneys were rather large and showed congestion on section. The capsule stripped easily, leaving a smooth surface. On histological examination the myocardium showed extensive fibrosis and areas of

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recent infarction. There were many patent blood-vessels in the graft lying over the epicardium, and there was also a very vascular subepicardial zone corresponding to it, as seen in Case 2. The specimen is receiving further histological study.

CASE 18

A housewife, aged 62, was admitted to Lambeth Hospital on April 23rd, 1937, with a six years' history of angina pectoris. During the last year her activity had been so much curtailed that she had been unable to go shopping. Pain had occasionally occurred in bed. She was also very short of breath, had a bad cough, and slept badly. She was in bed for three months with rheumatic fever at the age of 18. There was no family history of angina. She continued to have attacks of angina while in hospital, and after a severe attack on June 30th she was referred to the clinic.

Physical *examination* showed a rather obese and florid woman. There was gross oral sepsis. The heart was enlarged, the sounds were soft and spaced with a well-marked gallop rhythm, and there was a very soft mitral systolic murmur. The arteries were not thickened and the blood pressure was 186 mm. systolic and 106 diastolic. There were râles at both bases; the vital capacity was 1500 c.cm. and the chest expansion ¼ in. The abdomen was normal and the central nervous system also except for small irregular sluggish pupils. There was no œdema. The urine and kidney function tests were normal and the blood-urea 26 mg. per 100 c.cm. The Wassermann reaction was negative. X ray examination showed an enlarged heart. The electrocardiogram showed left axis-deviation and inversion of the T waves in lead I. The duration of Q R S was 0·12 sec.

All her teeth were extracted. When re-examined before operation, gallop rhythm was only just discernible, but the heart sounds were still tic-tac. There were very few basal râles and the blood pressure was 164 mm. systolic and 90 diastolic.

Cardio-omentopexy was performed on July 2nd. The phrenic nerve was crushed and a good graft obtained. The lung was emphysematous and a bulla could be seen posteriorly. The pericardium was tense and contained excess of fluid. The surface of the heart showed a pale area. Aleuronat was applied and the graft sutured to the edge of the pericardium. A well-marked inferior sterno-pericardial ligament and the lung fell nicely into apposition. The pulse-rate at the end of operation was 110 and the blood pressure 104 mm. systolic and 66 diastolic.

Her immediate progress was good. She developed purulent bronchitis and a urinary infection, both of which settled down. Tachycardia and leucocytosis however, persisted for no obvious cause, and three and a half weeks after operation she had an anginal attack lasting fifteen minutes. Her condition then slowly improved and by August 9th she had been up twice without ill effects. The following day she had two further attacks and was confined to bed again. Eight weeks after operation she was still confined to bed and was getting frequent attacks of pain, relieved by nitroglycerin. On examination the heart was not enlarged. There was tachycardia but no gallop rhythm. Very slight pitting œdema was present over the tibiæ. The blood pressure was 150 mm. systolic and 84 diastolic. She died suddenly on Sept. 6th, two months after operation.

At *post-mortem examination* the wound was found soundly healed. The left lung and the inferior sternopericardial ligament were adherent to the graft, which was itself adherent to the heart. There was complete adhesion of the pericardium, and on separation of part of it several bleeding points could be seen on the surface of the heart. The heart showed hypertrophy of the left ventricle, with diffuse fibrotic changes in the myocardium. The coronary tree showed diffuse sclerosis and atheroma, but detailed examination of its ramifications was not carried out as the specimen is being preserved for further histological study of the adhesions, which initial examination shows to be highly vascular. The lungs were normal. The abdominal viscera were not abnormal and the graft could be seen passing through the diaphragm at its normal site. The colon was not kinked.

CASE 19

An engineer, aged 55, was admitted to Lambeth Hospital from Dr. Blair Macaulay of Liverpool on July 26th, 1937, complaining of breathlessness on exertion of gradual onset, 3½ years ago, when working long hours under bad conditions on the Mersey Tunnel. Soon afterwards he had begun to get attacks of pain across the chest on exertion. At the time of admission he could not walk more than twenty or thirty yards without inducing an attack. His previous history was negative except for a herniotomy ten years ago, and there was no family history of angina.

Physical *examination* showed a lean but well-nourished man of florid complexion. The tongue was moist and clean, but the gums round his six remaining teeth showed pyorrhœa. The heart was not enlarged, the sounds were only just audible, and there were no murmurs. The radial and brachial arteries were moderately thickened and the blood pressure was 100 mm. systolic and 70 diastolic. There were a few persistent râles at the right base and a constant cough was noticeable. The chest expansion was 1½ in. Nothing abnormal was found in the abdomen. The urine contained a trace of albumin. The blood-urea was 44 mg. per 100 c.cm. and the urea-concentration test was normal. The Wassermann reaction was negative. X ray examination showed a normal heart shadow. The electrocardiogram showed a low voltage, the Q R S complexes measuring 1 mm. in lead I. The T waves were upright in all leads but low in lead I.

He was treated with breathing exercises and a stimulating expectorant mixture, and his remaining teeth were extracted. His cough and sputum persisted, however, and it was decided that he was only fit for pericardiotomy via Larrey's angle. This operation was advised in the hope that he might improve sufficiently to allow cardio-omentopexy to be performed at a later date. His vital capacity before operation was 3150 c.cm.

Pericardiotomy via Larrey's angle was performed on August 28th. The heart was greyish-yellow in colour. In spite of the minor nature of the operation he developed purulent bronchitis with mild pyrexia but no leucocytosis. He was allowed up for the first time two and a half weeks after operation and was discharged home for personal reasons on Sept 23rd, his blood pressure being only 96 mm. systolic and 66 diastolic. He was able to walk round the grounds and up one flight of stairs without pain or breathlessness.

His improvement was short-lived and he now reports that his condition is as bad as before the operation.

To sum up, of these fifteen cases of angina submitted to operation we record five deaths: one of uræmia in a man aged 72, three months after operation; the second at operation through rupture of a friable ventricle; the third of pulmonary infarction two months afterwards; the fourth suddenly in the second month, following a stormy convalescence complicated by pneumonia, empyema, and necrosis of a costal cartilage; and the last suddenly for no apparent cause, again two months after operation. On the other hand, of the ten who lived we have knowledge that eight have eventually enjoyed freedom from angina, and of the eight men seven are back at work.

(To be concluded)

MENTAL AFTER-CARE ASSOCIATION.—The object of this association is to provide some form of assistance, including homes for convalescence, for the poor treated in public mental hospitals to bridge over the difficult period intervening between recovery and return to normal life. Later some are helped to find suitable employment. This year nearly 4000 people have been befriended by the association. It also assists authorities who are adopting the boarding-out system for chronic patients. An earnest appeal for funds to carry on and extend this work is being made. Contributions should be sent to Miss E. D. Vickers, 354, Grand Buildings, London, W.C.2.

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A NEW SYNDROME APPARENTLY DUE TO OVER-ACTIVITY OF THE POSTERIOR PITUITARY

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A PATIENT presenting the combination of hypertension, hyperchromic anæmia, achlorhydria, and abnormal carbohydrate tolerance has been investigated for the past eight months and, as this syndrome has not been previously reported, a preliminary account is given here.

CASE-HISTORY

A. B., aged 26, an insurance broker, was first seen on March 7th, 1937, complaining of "not feeling fit" and of nose-bleeding.

He had had intermittent epistaxis for a week in March, 1937, and since then had had lethargy, discomfort in the lumbar region, and occasional diffuse headaches. There was undue dyspnœa on exertion and he had a slight cough. There were no urinary or gastro-intestinal symptoms but he had occasional "thumpings of the heart." He smoked 15–20 cigarettes daily. His weight was stationary and he had a good appetite with a preference for fatty foods and an avoidance of salt at all times. The bowels acted regularly. Previously he had always been well; he could not date the definite onset of the symptoms apart from the epistaxis. His father died of "angina" at 55; his mother and one brother were alive and well.

TABLE I—SUMMARY OF BLOOD COUNTS

Date.	Hæmoglobin (%).	Erythrocytes (per c.mm.).	Colour-index.	Leucocytes (per c.mm.).
March 7th .. (Liver given)	78	3,400,000	1·26	2800
March 15th ..	86	4,080,000	1·16	9100
„ 23rd ..	84	4,770,000	1·04	6300
„ 30th .. (Liver discont.)	92	5,430,000	0·93	3500
April 5th .. (Liver given)	88	3,320,000	1·45	3850
April 15th ..	102	4,650,000	1·18	5250
May 11th ..	92	5,480,000	0·92	7700
„ 30th ..	100	4,840,000	1·14	4900
July 25th ..	80	5,500,000	0·80	4900
August 7th ..	100	5,040,000	1·08	—
Sept. 22nd ..	100	5,030,000	1·08	6650

discont. = discontinued.

Examination.—The patient is a lean athletic man of sallow complexion with hair thinning in the frontal region and the vertex. Height, 5 ft. 10 in.; weight, 155 lb.; tongue normal; teeth good. Pulse 72, regular and of good tension, arteries not obviously thickened; apex-beat 4 in. from the midline in the fifth intercostal space; no cardiac enlargement to the right of the sternum; heart sounds normal apart from accentuation of the aortic second sound; blood pressure in both arms 190/110, and in the legs 200/110. Lungs: nothing abnormal discovered. Abdomen: ? tip of spleen just palpable. Nervous system: reflexes all present and brisk; sensation normal; pupils dilated, reacting briskly to light and accommodation. Fundi: veins full, arteries somewhat narrowed; no hæmorrhages or exudate. Urine: sp.g. 1022, *p*H 5·7; no albumin, sugar, acetone, or blood; trace of urobilinogen; oxalate crystals ++; chlorides ++.

SPECIAL INVESTIGATIONS

Radiography showed clear lung fields and a heart-lung ratio within normal limits; the pituitary fossa was normal, almost roofed over, and the sinuses were clear.

Capillary resistance (tourniquet test): strongly positive.

Blood counts are summarised in Table I.

Gastric residuum (six hours after last meal).—May 6th, 1937: 8 c.cm. of opalescent fluid removed with difficulty; no free HCl; total acids (combined acid) equivalent to 1·5 c.cm. of N/10 NaOH or 0·0054 per cent. HCl. After 0·25 mg. histamine subcutaneously only 5 c.cm. of gastric juice could be obtained twenty minutes later; no free HCl; total acids equivalent to 2·3 c.cm. of N/10 NaOH or 0·0083 per cent. HCl. The two samples were similar in appearance and there was a considerable quantity of mucus.

TABLE II—BLOOD-SUGAR CURVE OF THE PATIENT IN MAY, 1937

Fasting level.	Number of minutes after 50 g. of glucose were given.			
	30	*60*	*90*	*105*
129 mg.	338 ..	286 ..	314 ..	270

TABLE III—BLOOD-SUGAR CURVE OF THE PATIENT IN SEPTEMBER, 1937

Fasting level.	Number of minutes after 50 g. of glucose were given.			
	30	*60*	*90*	*120*
146 mg.	238 ..	177 ..	228 ..	204

Fæces.—Formed, brown, no abnormal amount of mucus, no blood; large numbers of soap flakes present and a few fat droplets. Fat estimation *on dried fæces* (May 23rd): total fat 31 per cent., total fatty acids 21 per cent., and neutral (unsplit) fats 10 per cent.

Renal function.—Early morning fasting specimen: sp.g. 1022, volume 150 c.cm., urea 3 g. per 100 c.cm. Then 15 g. of urea were taken in 100 c.cm. of water, and 1 hr. 50 min. later sp.g. was 1020, volume 150 c.cm., and urea 3 g. per 100 c.cm.; 3 hr. 30 min. later sp.g. was 1022, volume 113 c.cm., and urea 2·85 g. per 100 c.cm. (The patient found it impossible to pass urine at hourly intervals after the dose of urea.) Water-elimination test: after ingestion of 20 oz. water, 16·5 oz. of urine was passed within three hours. Blood-urea: 86 mg. per 100 c.cm.

Blood-sugar curves.—See Tables II and III. (Method of Hagedorn and Jensen on capillary blood.)

Further tests on August 8th.—Van den Bergh: direct reaction negative. Blood chlorides: 612 mg. per 100 c.cm. (Van Slyke method). Serum calcium: 8·8 mg. per 100 c.cm. (Clark and Collip).

COMMENT AND DISCUSSION

The combination of a hyperchromic anæmia and hypertension in a patient aged 26 was at first thought fortuitous; but the fact that Dodds, Noble, and others (1935a and b) had produced a hyperchromic anæmia in animals by means of posterior pituitary extract made one consider the possibility of hyperfunction of the posterior pituitary. Cutting, Dodds, and others in 1937 also produced achlorhydria with the extract, and the achlorhydria of this patient, together with his abnormal carbohydrate tolerance, strengthened this possibility, on which the following discussion is based.

The blood picture (Table I) was at first that of a hyperchromic anæmia. After administration of liver the blood count returned rapidly to normal, but on discontinuing liver the red cell count fell again. It was restored to normal when liver was again given, and though liver therapy was entirely discontinued after a month the blood picture has remained approximately normal since. Associated with this anæmia was a histamine-refractory achlorhydria. The van den Bergh reaction was unfortunately not done at the time when the patient was anæmic.

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Hypertension.—The blood pressure in April, 1937, was 190/110; it fell to 164/110 in July and returned to normal in September (Table IV). It will be seen

TABLE IV—BLOOD-PRESSURE READINGS

April 8th ..	190/110	July 1st ..	164/110
„ 23rd ..	205/110	„ 13th ..	165/100
May 13th ..	165/108	August 16th ..	160/104
June 1st ..	162/105	Sept. 23rd ..	130/80

from a comparison of Tables I and IV that in April, when the blood pressure was high, the blood picture was hyperchromic, and in September, when the pressure had returned to normal, the blood picture was normal.

Carbohydrate tolerance.—Tables II and III are representative blood-sugar curves. When the patient was first seen (Table II) his carbohydrate tolerance was grossly abnormal, but later (Table IV) when the blood pressure had fallen, the curve (Table III) is not nearly so abnormal. The patient has exhibited no symptoms of diabetes and his weight has remained constant for the last three years.

Carbohydrate metabolism and the pituitary gland.—The association of the anterior lobe of the pituitary with carbohydrate metabolism is well known, Houssay (1936) and others having shown that injections of anterior lobe extract produce a "diabetic" condition in normal animals, and Young (1937) having actually produced permanent diabetes in dogs after the injections were stopped. The relation of the posterior lobe extract (Pituitrin) to carbohydrate metabolism is less clear and somewhat disputed. Burn (1923), working on rabbits, demonstrated the antagonism of pituitrin to insulin, and Lawrence and Hewlett (1925), working on normals and diabetics, demonstrated the same antagonistic effect but found no appreciable or constant effect on the blood-sugar when pituitrin was injected without insulin. Lambie (1926), however, showed that pituitrin does elevate the blood-sugar and this in turn has been disputed.

Diabetes and anæmia.—A hyperchromic anæmia with diabetes is rare and is usually regarded as fortuitous. Wilkinson (1933) found that about 1 per cent. of patients with pernicious anæmia had diabetes, and recent correspondence in the *British Medical Journal* confirms the rarity of this association.

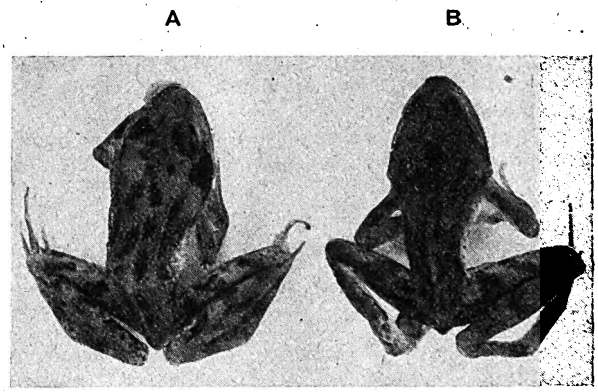
Anæmia and hypertension.—The association of a hypertension with a hyperchromic anæmia is also rare. Wilkinson found only 8 cases of hypertension among 370 cases of pernicious anæmia. Reinhart (1934–35) described pernicious anæmia in 3 elderly patients who had hypertension; their urine was normal and no tests were made for pressor substances. Dodds and others (1935 a and b), and Cutting, Dodds, and others (1937), have shown that injection of a posterior pituitary extract produces a hyperchromic anæmia in rabbits and also inhibition of the secretions of the stomach and pancreas. The vasopressor and antidiuretic effects of this extract are well known and in addition it also causes dispersion of the melanosomes in frogs.

PITUITRIN-LIKE ACTION OF AN EXTRACT OF THE PATIENT'S URINE

1. *Pressor action.*—In view of the findings in this patient, Dr. Noble was asked to test the blood and urine of the patient for pressor principle. This he kindly consented to do and his methods and results are given in detail in the accompanying paper. From the urine he extracted a pressor principle which caused a persistent elevation of the blood pressure of the cat, the tracing obtained being essentially similar to that obtained with posterior pituitary extract.

2. *Antidiuretic action.*—The extract also had a pronounced antidiuretic action on the rat, and when compared with the action of pituitrin it was found that the pressor and antidiuretic principles appeared to vary independently of each other.

3. *Melanosome-dispersing action.*—As the extract gave two of the actions of pituitrin its effect on the melanophores of the frog was investigated. With the coöperation of Prof. St. G. Huggett, I injected two frogs (*Rana temporaria*) with 0·1 and 0·5 c.cm. of the extract of the patient's urine. The control frogs remained a normal colour while the other frogs



Frog A was injected with 0·1 c.cm. of an extract of normal urine, while frog B was injected with 0·1 c.cm. of an extract of the patient's urine. Note the dark colour of frog B which is due to the dispersal of the melanosomes.

became very dark (see Figure) indicating the presence in the extract of a melanosome-dispersing principle.

4. *Other properties of the extract.*—Dr. Noble found that the pressor action of the extract was unaffected by boiling. This is also true for posterior pituitary extract. It should be noted that in September, when the hypertension had disappeared, the blood picture had returned to normal and the carbohydrate tolerance was better, the amount of pressor and antidiuretic substances in the urine had also very noticeably decreased.

PREVIOUS WORK ON PRESSOR SUBSTANCES IN THE BLOOD AND URINE

The question of pressor substances in the blood and urine has engaged attention for some years. Bohn (1931–32) and Coester (1934) claim to have detected pressor substances in the blood of "pale hypertensives" which were absent in the blood of normal persons and "red hypertensives." This work was not confirmed by de Wesselow and Griffiths (1934) who found, using Bohn's method, that a pressor principle can be detected in the blood of normal individuals, chronic glomerulo-nephritics, and malignant and essential hypertensives. Capps and others (1934) have also reinvestigated Bohn's findings and have not confirmed his results. The curves they obtained were very variable and they could find no correlation between them and the curves obtained with adrenaline, pituitrin, saline, or the carotid sinus reflex.

CONCLUSIONS

An extract of the patient's urine contained a substance or substances which had the actions of posterior pituitary extract and the clinical findings of hyperchromic anæmia, hypertension, and abnormal carbohydrate tolerance suggest that there is hyper-

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function of the posterior lobe of the pituitary. The fact that as his condition improved the amount of pituitrin-like substance excreted in his urine diminished indicates that the hyperfunction is either an isolated occurrence or is possibly cyclical in nature. Further observation of this patient over a long period will settle this point.

The syndrome described is thought to be new to clinical medicine, but the diseases that are known to affect the anterior lobe of the pituitary and other ductless glands lead one to believe that the hyperfunction of the posterior pituitary is at least theoretically possible. Some writers have affirmed that the posterior pituitary has no action in the normal body, but the work of Gilman and Goodman (1937) in demonstrating the presence of an antidiuretic substance in the urine of dehydrated rats, whereas hypophysectomised dehydrated rats have none, shows that it has a very definite action.

SUMMARY

A patient is described in whom hypertension, hyperchromic anæmia, achlorhydria, and abnormal carbohydrate tolerance is associated with the excretion in the urine of a substance which has the actions of posterior pituitary extract.

It is suggested that the syndrome is due to hyperfunction of the posterior pituitary.

I am deeply indebted to Miss Nora G. Sproston who first detected the anæmia and who has kindly carried out all the pathological investigations described.

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CLINICAL HYPERFUNCTION OF THE POSTERIOR LOBE OF THE PITUITARY

SUGGESTED BY A PRESSOR AND ANTIDIURETIC SUBSTANCE OBTAINED FROM THE URINE

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AND

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In the preceding paper Dr. E. I. Jones has described clinical findings which it is suggested are due to a hyperfunction of the posterior lobe of the pituitary gland. The case he reports presented the following features: hypertension, hyperchromic macrocytic anæmia which responded to liver therapy, achlorhydria, and abnormal carbohydrate tolerance. Experimentally the pressor effect of posterior pituitary extracts is well recognised; similarly a hyperglycæmic action has been demonstrated. The production of achlorhydria following injections of the vasopressive principle of posterior lobe extracts (Dodds and Noble 1937; Cutting, Dodds, Noble, and Williams 1937) which may in some animals be followed by a severe hyperchromic macrocytic anæmia (Dodds and Noble 1935) has been recorded. The similarity between the condition of this patient and that which could be produced in animals suggested that it would be of interest to determine whether the vasopressive principle could be obtained from the patient's blood or urine.

The recovery of antidiuretic substances from the blood of patients with toxæmia of pregnancy by ultrafiltration has been reported by some workers (Anselmino and Hoffmann 1931) and denied by others (Byrom and Wilson 1934). It is obvious from these and other papers that the recovery of active material was extremely variable using methods of ultrafiltration. Lately Melville (1937) has used 80 per cent. ethyl alcohol to extract the activity from heparinised blood, with apparently good results. The blood from this patient was therefore extracted according to his description. The untreated serum was also tested.

The urine has been extracted by a method similar to that described by Kamm (1928) and his associates for obtaining the different pituitary principles from posterior lobes.

After concentration of the acidified urine, the activity is precipitated with ammonium sulphate. This precipitate is dried and the active substance extracted with glacial acetic acid. The activity is precipitated from this by ether and petroleum ether. This dried precipitate is then extracted with 0·25 per cent. acetic acid, which contains the active substance.

This method was used on the earlier specimens of urine and was therefore used throughout, although it was later found in control experiments that the yield of active substance by this technique is under 50 per cent.

The antidiuretic activity has been assayed on rats by the method described by Burn (1931). Pressor activity has been measured on the spinal cat, using Pitressin as a standard. Samples of blood have been tested on two occasions—the first at the end of May when clinically the findings were most abnormal, and the second at the end of July when considerable clinical improvement had occurred.

Blood.—The May specimen of unextracted blood-serum was not tested for antidiuretic activity, but the intravenous injection of 5 c.cm. of serum produced a depressor effect followed by a rise of 20 mm. Hg in a spinal cat. This rise in pressure was not maintained, as is found in a typical pituitary effect, so the results were only suggestive of a pressor substance in the blood.

The June specimen of blood-serum was tested for antidiuretic activity and a dose of 0·25 c.cm. gave no effect. The serum similarly gave no pressor effect after the injection of 1 c.cm. Part of this specimen was extracted by Melville's method. It was found that the equivalent of 4 c.cm. of blood gave no antidiuretic effect, and the equivalent of 5 c.cm. contained no pressor substance.

Urine.—Specimens of urine were collected in May and July at the same time as the blood was obtained. A further sample was tested in August. It was later decided to see whether variation in the excretion of the active substance occurred, so a series of seven one-litre specimens were collected under comparable

* Working with a Leverhulme fellowship from the Royal College of Physicians of London.
† Working with a grant from the Medical Research Council.

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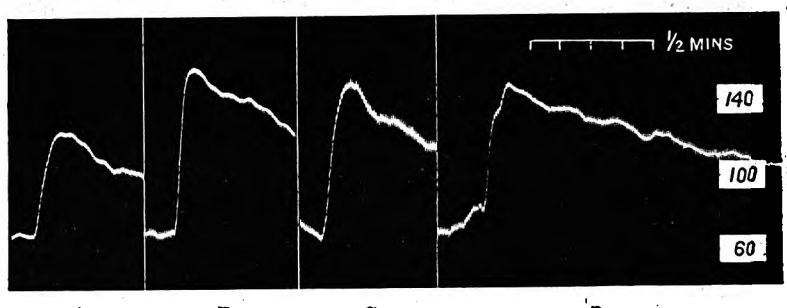
conditions from Sept. 8th to 20th and extracted separately.

A preliminary test on the extract obtained from the May specimen of urine showed that a considerable amount of activity was present. In the accompanying Figure the pressor action is shown and compared with that of pitressin on the same spinal cat. The types of curve given are seen to be essentially the same. Also after heating the urine extract at 100° C. at *p*H 3 for 45 minutes there was no change in activity. From this it is seen that the extract from 70 c.cm. of urine produced an 84 mm. Hg rise in pressure and is approximately the same as 0·2 unit of pitressin. In Table I the antidiuretic activity of this extract is given and may be compared with pitressin. The amount of active substance obtained from only 2 c.cm. of urine is seen to exert a definite action.



Spinal-cat pressor assay. (A) = 0·1 unit pitressin. (B) = 0·2 unit pitressin. (C) = Extract of May urine, equivalent to 70 c.cm. (D) = Extract of May urine (equivalent of 70 c.cm.) after heating.

In Table II the assays on all the urine specimens are given. The May extract was tested on frogs by Dr. Jones and contained a melanosome-dispersing principle. Control extracts have been prepared from the urine of normal persons and tests on these have always given negative results.

The pressor substance obtained from the urine appears to have an effect indistinguishable from that in the posterior pituitary. The typical blood-pressure curve, method of extraction, and stability support such a suggestion. The difference in the amounts of pressor and antidiuretic substances suggests that they are separate principles. However, it has been shown (Dodds, Noble, Rinderknecht, and Williams 1937) that under certain conditions the antidiuretic effect of pituitary extract can be prolonged, and an apparent increase in activity be obtained. It is possible that the urine extracts described may contain material which prolongs the urinary effect but would not affect the intravenous pressor assay.

The urinary antidiuretic substance appears to differ from the vasopressive principle in that it is less stable to heat in acid solutions. In general, however, it can be seen that the active preparations from the urine behave in a way so similar to posterior pituitary extracts as to suggest that these substances are identical or closely related.

TABLE I—ANTIDIURETIC ASSAY OF MAY URINE EXTRACT

No. of rats.	Substance.	Percentage of total urine excretion in—							
		½ hour.	1 hour.	1½ hours.	2 hours.	2½ hours.	3 hours.	3½ hours.	4 hours.
24	Water alone.	3·0	22·5	56·5	86·0	98·0	100·0	—	—
44	0·02 unit pitressin.	0·0	2·0	12·0	37·0	65·0	85·0	97·0	100·0
44	0·04 unit pitressin.	0·0	0·0	2·0	14·0	35·0	63·0	85·0	97·0
12	EXTRACT MAY URINE EQUIVALENT TO 2 C.CM.	0·0	0·5	3·0	12·0	33·0	61·0	86·0	95·0

TABLE II—URINE ASSAY FOR PRESSOR AND ANTIDIURETIC ACTIVITY (PITRESSIN AS STANDARD)

Urine specimen.	Pressor units per 1000 c.cm.	Antidiuretic units per 1000 c.cm.	100° C. *p*H 3 1 hr.
May	3·3	20·0	5·0
July* ..	<0·1	<0·1	—
August ..	1·17	5·0	1·3
Sept. 8th ..	1·5	2·0	<0·2
„ 10th† ..	<0·1	<0·2	—
„ 11th ..	0·1 (approx.)	<0·2	<0·2
„ 14th ..	<0·1	<0·2	—
„ 16th ..	<0·1	2·0	0·5
„ 18th ..	<0·1	<0·2	—

Pressor effect unchanged by heating.
* Urine alkaline.
† Friedman test negative.

The demonstration by Gilman and Goodman (1937) that an antidiuretic substance was excreted in the urine of rats after dehydration, and that this does not happen with hypophysectomised animals, suggests that a pituitary hormone may be excreted under suitable conditions. Melville (1937) has further shown that the active substance rapidly disappears from the blood and from the observations of Dale (1909) and Heller and Urban (1935) a urinary elimination, at least in part, appears probable. Our observations that an active substance could be recovered from the urine and not the blood therefore seem in accordance with the above findings.

Although the method of extraction employed gives a low yield of active material it is apparent that this patient was excreting a comparatively high concentration of the active substance. Later assays giving lower values are in agreement with the clinical improvement that took place in this case. Further observations are in progress to determine whether active urinary preparations can be obtained in other types of pathological conditions.

SUMMARY

An extract containing pressor and antidiuretic activity has been obtained from the urine of a

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case of suggested hyperfunction of the posterior pituitary.

The effects of this extract are similar to those produced by the pressor principle of pituitary preparations.

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ELECTROSURGICAL OBLITERATION OF THE GALL-BLADDER WITHOUT DRAINAGE*

A REPORT OF 342 CASES

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REMOVING the gall-bladder by means of the scalpel yields in competent hands a mortality of about 1 or 2 per cent. in uncomplicated cases. The mortality increases with age and is greater in males than in females. It ranges around 10 per cent., and taking into consideration the unreported results of the general surgeon, it may on occasion be as high as 20 or 30 per cent. or even higher depending upon the presence of complication (Table I).

An analysis of fatalities following classical cholecystectomy affords food for the following reflections:

1. From 15 to 25 per cent. of patients have enlarged bile capillaries and small bile-ducts running in the gall-bladder bed which cause bile leakage when the gall-bladder is removed from its bed with the scalpel.

2. Bile in the peritoneal cavity when sterile is a chemical poison. When infected it may give rise to biliary peritonitis.

3. A properly ligated cystic duct does not leak; bile usually issues from the gall-bladder bed as pointed out by Bakes (1928). He observed bile issuing from the wound 230 times in 346 cases of simple cholecystectomy. Like many other surgeons he was impressed by the post-operative appearance of bile in the dressing "in nearly all the cases."

4. After classical cholecystectomy the gall-bladder bed cannot always be obliterated by sutures. Drainage is then resorted to and this invites leakage. Open unprotected bile and blood channels in the gall-bladder bed, following cholecystectomy by the classical method, offer a favourable atrium for the entrance of micro-organisms.

5. Drainage causes trouble in a number of ways (augmentation of bile seepage; thrombosis and embolism; hæmorrhage from erosion of vessels; cholæmic bleeding; embarrassed cardiac action, particularly in the aged; pneumonia; acute dilatation of the stomach; biliary fistulas, &c.). To put it differently, *many patients die after gall-bladder operations not because they were not drained but because of drainage.* Nevertheless though many dangers may be eliminated by omitting drains, drainage instituted where classical cholecystectomy is practised may be the means of saving a life.

In striving to ascertain how the evils of drainage can be avoided and how one may frustrate leakage from divided capillaries and small bile-ducts, I thought that if a dry, non-leaking surface could be substituted for the discharging cavity represented by the gall-bladder bed resulting from classical cholecystectomy, it would be an important step in the right direction. Experimental studies on dogs and monkeys proved that this can be accomplished by proper electrocoagulation, which, when properly performed, converts the tissues into a hyaline-like, dry, aseptic, inert tampon. Unfortunately, electrocoagulation is still confused by the uninitiated with fulguration and carbonisation, which are entirely different in their action and effects. It is important to understand the differences (vide Ellis 1932).

Monopolar sparking from a high-frequency transformer of Tesla, d'Arsonval, or Oudin was termed *sideration* by Keating-Hart and *electrodissection* by Clark and later *fulguration* by Pozzi. Nagelschmidt introduced the now accepted term *diathermy*. *Bipolar diathermy* for surgical purposes was first called *voltaisation bipolaire* and later *electrocoagulation* by Doyen; Delherme and Laquerrière spoke of *endothermy* showing that the heat is produced in the patient's body. George Wyeth in 1926 simplified the terminology by coining the terms *medical* and *surgical diathermy*. Hanschen speaks of *exsiccation*, *charring*, Heitz-Boyer of *etincélage*, Cushing of *dehydration*, Kowarchik of *electrotomy*, von Seemen of *Schmelzschnitt*.

If a flat electrode of a bipolar current is firmly applied to a tissue surface and a current of proper voltage and sufficient amperage is permitted to pass through it, dehydration and coagulation of the tissue-proteins results in a few seconds and the tissue turns white. This is *electrocoagulation*. On the other hand, if this same electrode is not applied firmly or if it is used as a unipolar instrument, a small air-space (dielectricum) intervenes between the

TABLE I

Mortality Statistics in Gall-bladder Operations (1908–32)

—	Year.	Cases.	Mortality (per cent.).
Cotte, M.	1908	Not given.	M., 33 F., 18
Davis, B. B.	1921	563	8·17
Enderlen and Hotz.	1923	12,144	9·28
Brentano.	1923	280	M., 36·78 F., 17·29
Villard.	1925	131 cholecystostomies.	M., 34 F., 21
Duclos.	1926	Global mortality.	M., 36 F., 23
Davis, B. B.	1928	160	3·75
Cattell, R. B.	1929	311 (complications 55).	M., 9·1 F., 6·8
Sanders, R. L.	1930	18 reported series, totalling 60 cases.	15
Verbrycke.	1927	169*	8·8 28·5 15
Tixier, Clavel, and Chabannes.	1932	11 males. 149 females.	M., 36·38 F., 16
Thorek.	1910–32	138 males. 511 females.	M., 16·8 F., 9·4

* Operated on by 23 surgeons; one surgeon had 19 and another had 20.

M.= Male. F.= Female.

* Read at the British Postgraduate Medical School, London, on Sept. 8th, 1937.

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electrode and tissues and *sparking, fulguration,* and *carbonisation* with black discoloration of the tissues results. A reapplication of the electrode to such fulgurated or carbonised surface will stop further current-penetration and prevent coagulation from taking place (Fig. 1). In cauterisation the heat is brought to the tissues from the outside by the heated instrument, whereas in bipolar or short-wave electrocoagulation the heat is produced in the patient's body (75,000 to 3,000,000 or more oscillations are produced per second depending upon the type of apparatus used).

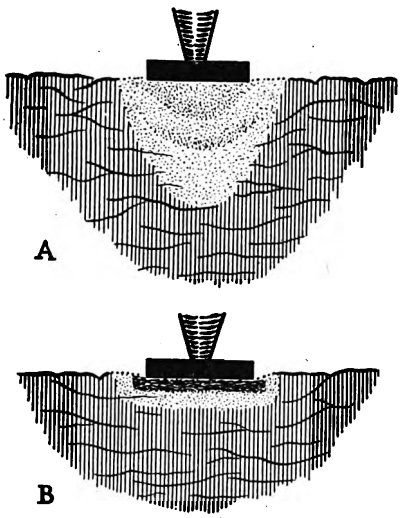

FIG. 1.—Effects of electrocoagulation and of carbonisation. In (A) one observes the degree and extent of electrocoagulation when correct technique is used. The dense area immediately under the electrode indicates that here the action is of greatest intensity. It gradually decreases as indicated in the diagram. Marginal action is seen to extend for some distance from the border of the electrode. With improper use (dielectricum) and the application of too much current charring results immediately under the electrode (B). Such eschar insulates the area acted upon and further effects of coagulation are frustrated.

Definite tissue changes take place when the liver is subjected to the electrocoagulating bipolar current. This problem has been ably worked out jointly by Kuntzen and Vogel (1931). Electrocoagulated surfaces within the abdomen do not slough as do surfaces on the exterior or in open cavities (mouth, vagina, cervix); in such places coagulated areas are eliminated by extrusion, but within the abdomen they become encapsulated and are absorbed. Electrocoagulated surfaces on parenchymatous organs develop an affinity (a positive chemotaxis) for serous surfaces attracting contiguous organs covered with serosa (omentum, stomach, bowels). I have observed such agglutinations three hours after electrocoagulating the surface of the liver. Firm union takes place in a comparatively short time. Capillaries and blood-vessels of an electrocoagulated area do not thrombose but a recession of the column of blood is formed within the vessel, above and below the point of contact of the electrode, and the vessel walls coalesce with the contiguous, homogeneous, hyaline-like structures mentioned. Such changes do not take place with fulguration or carbonisation.

Another important fact to be remembered is that electrocoagulation of the tissues in the gall-bladder bed frustrates secondary hæmorrhage because of the pressure exerted by the sequestrated, coagulated segment against the contiguous tissue. Thus *electrocoagulation substitutes a secure sterile tampon for an insecure open cavity at the site of the gall-bladder bed,* resulting from classical cholecystectomy. Of late I have been using short-wave unipolar coagulation with entire satisfaction.

EVOLUTION OF AUTHOR'S METHOD

For some years we performed experiments upon large dogs and monkeys (*Macacus rhesus* and *M. leoninus*). Anatomic differences and lack of gall-bladder pathology in these animals should be kept in mind. My experiments allow the following conclusions:—

1. The posterior gall-bladder wall and bed of the gall-bladder may be effectually electrocoagulated and their structure converted into an inert dehydrated hyaline-like aseptic tissue.
2. Electrocoagulated borders of the gall-bladder thus treated may be approximated with sutures.
3. The ligamentum falciforme hepatis may be completely detached and when superimposed over an electrocoagulated surface will become intimately united with it.
4. The abdomen may be closed without drainage in such instances provided the cystic duct is securely ligated and the cystic artery closed by double ligation.

Priority for introducing electrosurgery in gall-bladder disease belongs to Trowbridge. He described electrosurgical cholecystectomy with recovery in 1928. Heymann (1930) substituted the diatherm knife for the scalpel, as did also Keysser, Mirizzi, and others; the results were little different from those of classical cholecystectomy. Pribram (1928, 1929) used carbonisation of the mucosa with the Paquelin burner and later (1933) with a diatherm apparatus. He called his method *mucoclasis.* Pribram's procedure is a fulguration method aiming at destruction of the mucous membrane of the gall-bladder; but as I have shown in another communication (1933) it does not entirely obliterate the gall-bladder and thus eradicate disease, for the charred mucosa prevents the current from reaching the depths of the affected zone in the gall-bladder wall—viz., the Rokitansky-Aschoff sinuses which harbour infection Equally, simple fulguration is not adequate where the infection has extended into the depths of the gall-bladder wall, bed and liver substance to various depths. Whitaker (1930) combined Pribram's cauterisation procedure with drainage in 16 cases, disregarding the admonition that electrocoagulated surfaces must never be drained, and reported a mortality of 18·75 per cent.!

After using Pribram's method for some time, I found that patients were not relieved of their symptoms and required reoperation. At such time it was noted that there was regeneration of the mucous membrane of the gall-bladder mucosa and the

TABLE II

Electrosurgical Obliteration of the Gall-bladder

Cases operated by Thorek		267
Cases operated by others (Kellogg, Warren, Finlayson, Baller, de Victoria, Weyman, Heineck, Montgomery)		75
Total of unselected cases of gall-bladder disease operated on to date (August, 1937)		342
Sex	Male	43
	Female	299
Age	Youngest	18 years
	Oldest	74 "
Average high temperature		100° F.
Average days in hospital		15·5
Pathologic conditions found at operations—(1) acute and chronic cholecystitis; (2) cholelithiasis; (3) hydrops vesicæ felleæ; (4) empyema of the gall-bladder; (5) acute hæmorrhagic cholecystitis; (6) hepatitis; (7) adhesions; (8) chronic pancreatitis.		
Post-operative complications—(1) bilateral pleurisy with effusion, ten days after operation; cleared up; patient left hospital 27 days after operation; (2) wound infections (3 cases).		About 0·5 %
Mortality (three deaths). Causes of death—(1) bilateral pulmonary collapse; (2) pneumonia, five weeks after operation; (3) subdiaphragmatic abscess.		About 0·5 %*

* Since this paper was presented 9 additional cases have been operated on by me by the method described without a death, making a total of 351 cases.

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diseased layers of the gall-bladder were little or not affected at all. Infection persisted. It occurred to me then that complete destruction of the gall-bladder wall would be a step in the right direction. The following procedure was evolved :—

(1) Electrosurgical obliteration of the posterior gall-bladder wall and gall-bladder bed by electrocoagulation (biterminal or by short wave) thus substituting a sterile, dehydrated tampon for a bleeding, bile-leaking surface.

(2) The great tendency of electrocoagulated surfaces to become agglutinated with serous surfaces caused me to muster the falciform ligament into service.

(3) Strict avoidance of drainage.

So far (August, 1937) 342 operations have been performed by my method in cases of gall-bladder disease including gangrene, empyema, and sclerosis. Of these, 267 cases were done by myself and the remainder by Drs. Homer S. Warren, Jr., Bliss Finlayson, Edward L. Kellog, Cassius Lopez de Victoria, Stanley Baller, and others. There were 3 deaths in this series. One patient succumbed to an undiagnosed chronic subdiaphragmatic abscess some time after operation (post-mortem confirmation). Another patient died from massive bilateral pulmonary collapse, and the third from pneumonia about three weeks after the operation. If these 3 deaths are credited to the operation, we are confronted with a mortality of less than *1 per cent.* A comparison of these results (Table II) with those shown in Table I shows a sharp contrast. Whether my procedure alone or the painstaking pre- and post-operative care of patients, or both, was responsible for these results, I cannot say; but certainly thorough preoperative preparation of the patient is imperative.

OPERATIVE TECHNIQUE

STEP 1.—In well-trained hands, subarachnoid block is the anæsthetic of choice; otherwise, inhalation anæsthesia is administered. The patient is placed in the Mayo-Robson position with the lower thorax and upper abdomen sufficiently elevated. When the biterminal apparatus is used, a large flat, indifferent electrode is snugly applied over the sacrum. Where short-wave is used an indifferent electrode is not necessary. Preferably a straight longitudinal paramedian incision is made beginning at the lower costal margin and extending to about the level of the umbilicus. Exposure must be thorough.

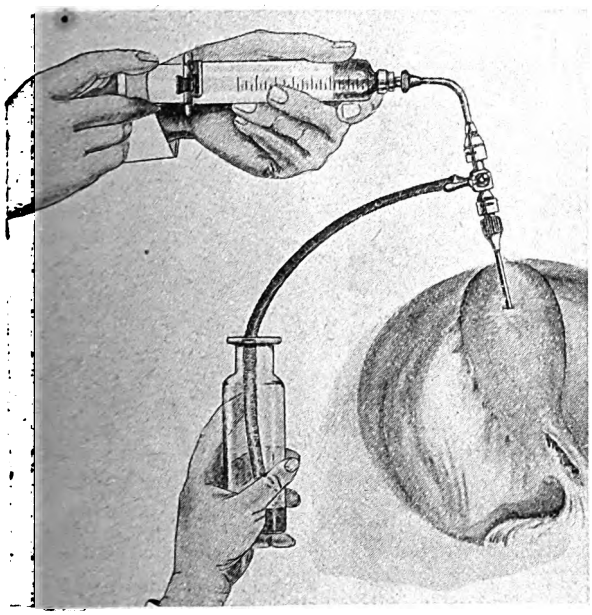

FIG. 2.—Author's gall-bladder aspirator.

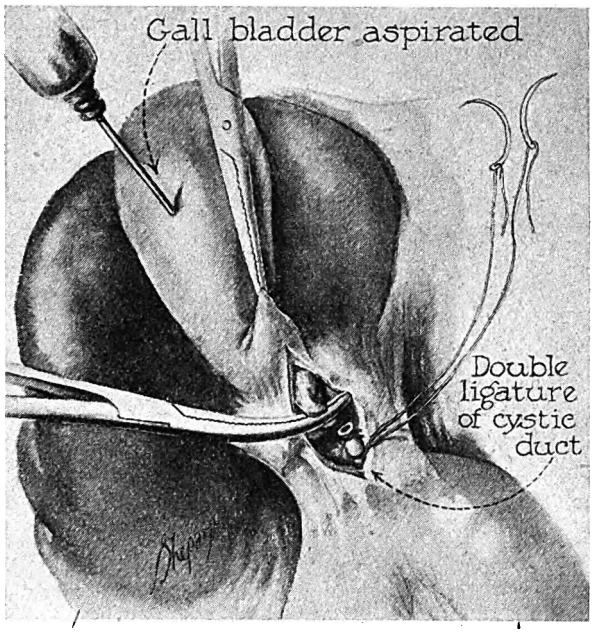

FIG. 3.—After aspiration of the gall-bladder the cystic duct and cystic artery are doubly ligated, the duct and artery divided and the ligature cut short.

STEP 2. *Mobilisation of the falciform ligament.*—This structure is completely detached from the anterior abdominal wall. The detached ligament is now placed in a receptacle containing warm normal salt solution. In detaching the falciform ligament from the anterior abdominal wall, some small vessels are severed; these must be carefully ligated. Pack the viscera out of the way and obtain good exposure by efficient retraction. (The hypodermic injection of an ampoule of Pitressin about ten minutes before the operation is begun aids in keeping the bowels out of the way.)

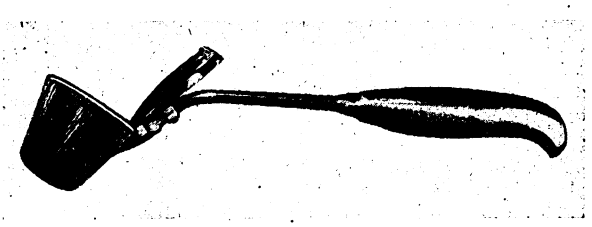

FIG. 4.—Author's non-spillable bile receptacle.

STEP 3. *Exploration of biliary passages.*—I cannot agree with some writers that opening of the common duct should be resorted to as a routine or that instrumental exploration of the common duct is free from danger. The gall-bladder is aspirated. I use an especially designed aspirator which permits evacuation of the gall-bladder contents into a receptable via a rubber tube (Fig. 2). After aspiration of its contents, the gall-bladder is filled with hexylresorcinol (S.T. 37) or some other antiseptic solution. Only about 5 per cent. of bile contains micro-organisms,

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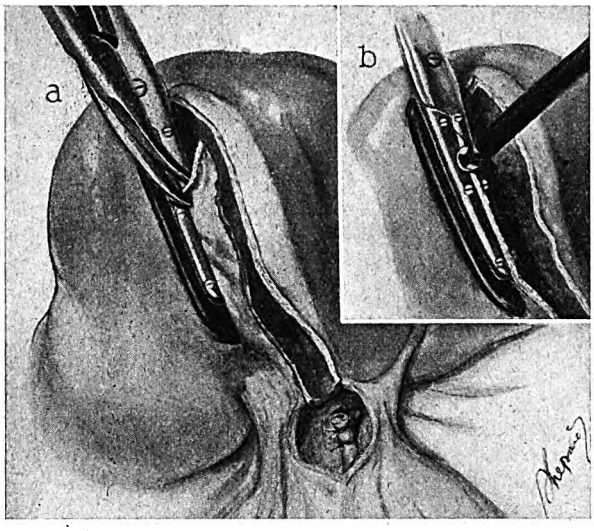

FIG. 5.—(*a*) Opened gall-bladder crushed with author's insulated angiotribe forceps and redundant portion of gall-bladder removed with ordinary scissors. (*b*) Remaining strip of gall-bladder in grasp of forceps being electrocoagulated with short-wave current. The current passes through the forceps but not beyond the insulated protector.

while their presence in the gall-bladder wall may be demonstrated in over 70 per cent. of cases. For that reason I introduce an antiseptic into the gall-bladder before opening it. If the cystic duct is patent we probe the ducts; otherwise digital exploration is resorted to. The extrahepatic biliary passages may be explored through the opened gall-bladder. The cystic artery and duct are ligated doubly and jointly, cutting both ligatures short. Experience has taught me not to attempt extensive dissections in search for the cystic artery if it is not easily isolated, but to splint it with the ligature to the cystic duct. This advice could be followed particularly where there is much infiltration in and about the hepatoduodenal ligament. The frequently abnormal course of the artery should be kept in mind (Fig. 3).

STEP 4. *Open the gall-bladder and evacuate its contents.*—I have designed a gall-bladder content receptacle which collects the evacuated material without spilling it (Fig. 4). Old-fashioned gall-bladder spoons are too shallow and offer no protection against contamination from spilled contents. My instrument consists of a cone-shaped container measuring 2¼ in. in diameter and 2 in. in depth, mounted on a shaft of suitable size. A close-fitting cover is hinged and held open, when in use, by means of spring friction clips. Slight pressure upon the cover releases it so that the material cannot spill during its removal. The front part of the receptacle is somewhat concave, allowing sufficient latitude for proper contact with the subcholecystic structures, and its edges are rodded, thus avoiding injury to the liver.

STEP 5.—*Split the gall-bladder* longitudinally from above downward with an ordinary pair of scissors. Grasp half of the gall-bladder wall with an insulated angiotribe forceps or a rubber-covered ordinary artery forceps, of proper size and thickness. In closing the forceps, the gall-bladder wall is crushed and the blood-vessels coursing in it closed by compression. With an ordinary pair of scissors remove the redundant portion of the gall-bladder wall. Apply a small electrode firmly along the exposed margin of the gall-bladder held in the forceps. The smaller the electrode, the quicker the action. The current will electrocoagulate the gall-bladder wall in the grasp of the forceps. After sufficient coagulation, the forceps is opened; a compressed coagulated ribbon of tissue remains (Fig. 5A and B). Repeat the procedure on the other half of the gall-bladder. Electrocoagulate the remaining portion of the posterior wall of the attached gall-bladder, which has not yet been acted upon (Fig. 6).

In my early work I thought it advisable to electrocoagulate slowly but experience has taught me that quick decisive coagulation with firm electrode contact yielded the best results. I use a current of low voltage and high amperage on a rather small electrode. On this unit (Fischer Model S.W. 12) as the voltage drops, the amperage increases; this affords prompt, thorough dehydration and a sharply defined line of demarcation between the coagulated and non-coagulated tissue. Tissue thus coagulated will retain less moisture than tissue coagulated more slowly and less heat is radiated to the contiguous structures. Another reason for substituting rapid coagulation with a smaller electrode is that slow coagulation results in heating of the tissues to quite an extent beyond the electrode, about 0·5 cm. to each millimetre. There is no sharp line of demarcation in slow coagulation; the tissue changes are gradual.

It must again be emphasised that the electrode must be applied snugly to avoid carbonisation. The current should be turned on only after the electrode is firmly in contact with the tissues to be acted upon, and that fulguration and its attendant carbonisation must be avoided because such carbonisation will defeat the purpose of the operation.

When the steps of the operation are completed as here outlined, there will be present an area represented by the electrocoagulated posterior wall of the gall-bladder attached to the gall-bladder bed.

STEP 6.—*Approximate the electrocoagulated edges of the gall-bladder* by a few interrupted or a continuous suture of fine catgut. While thus approximating the edges without strangulating them, the needle carrying the catgut must not penetrate the liver substance—only the edges of the coagulated ribbon are picked up (Fig. 6D).

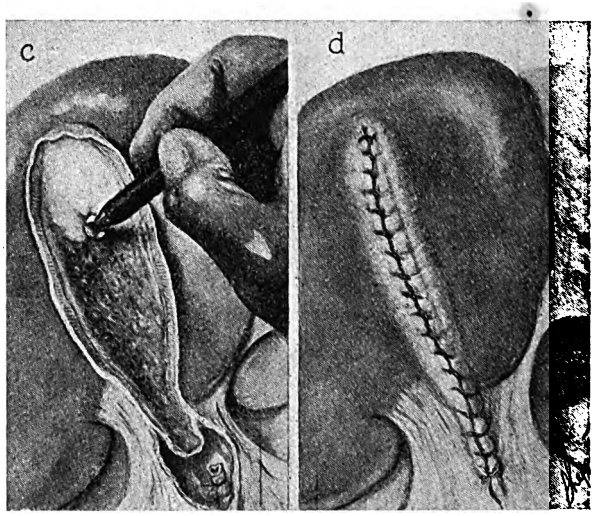

FIG. 6.—(*c*) The insulated angiotribe forceps are removed leaving ribbon of crushed and electrocoagulated strip of gall-bladder tissue all around gall-bladder bed. The posterior wall of the gall-bladder in the middle of this ring is being electrocoagulated. (*d*) Strip of electrocoagulated and crushed ring of tissue of gall-bladder united with continuous catgut sutures.

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STEP 7. *The detached falciform ligament is now removed from the salt-solution container.*—One end of the ligament is sutured to the upper end of the united, coagulated gall-bladder bed (Figs. 7 and 8). The lower third of the ligament is now stitched to the lowermost end of the approximated electrocoagulated surface and the free end of the ligament is placed, but not sutured, against the doubly ligated end of the cystic duct and artery. An effective serous covering is thus formed over the gall-bladder bed and cystic duct. Two sutures are used as a rule, one above and one below.

STEP 8.—*The laparotomy packs and retractors are removed;* the field of operation is dried and the abdominal wall closed in the usual manner *without drainage.*

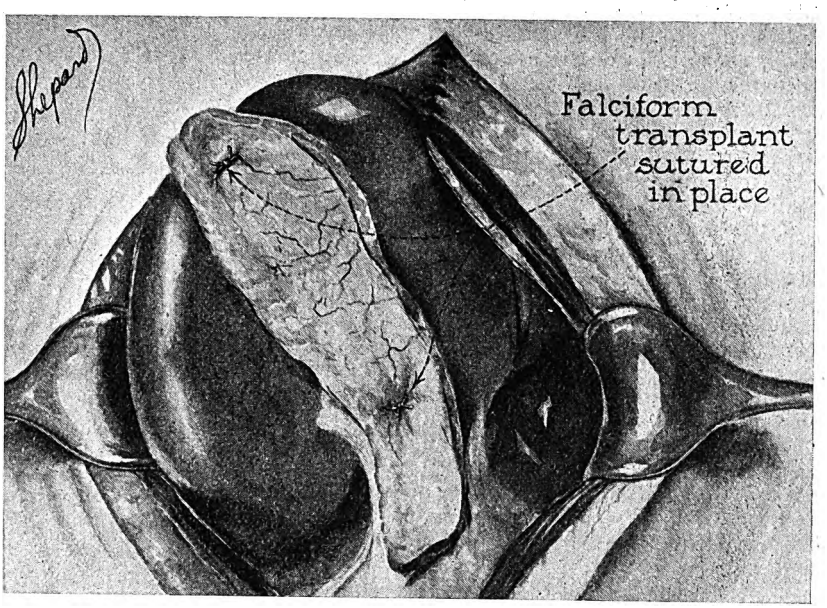

FIG. 8.—Appearance of field of operation after completion of final stage.

What becomes of the structures in the gall-bladder bed after the operation described? The answer to this has been given based upon animal experiment. Recently a post-mortem examination was done on a patient who died of acute pulmonary tuberculosis on whom I performed this operation eighteen months before her last illness. Microscopic sections showed firm union of the ligament to the underlying liver, the cords of which appeared histologically normal.

CONCLUSIONS

1. A method of electrosurgical obliteration of the gall-bladder is described which when carefully followed may be used in simple and complicated cases of gall-bladder disease without resorting to drainage. It reduces mortality to a minimum and cuts hospitalisation. The much dreaded age factor in these operations loses its terror. Shock is usually absent.

2. Failures and fatalities in classic cholecystectomy after the operation are often due to bile leakage, as a result of an inability to obliterate and cover the gall-bladder bed, which contains bile capillaries and often larger bile-ducts, in 15 to 25 per cent. of the cases. Drains invite bile seepage. The method here described seals these openings by electrocoagulation. A sterile, hyaline, dry, protective layer is substituted for a raw unprotected surface. The falciform ligament is superimposed over this area. Drainage is entirely omitted.

3. The operation here described must not be confused with mucoclasis practised with the cautery or with "diatherm-fulguration" which aims at burning or carbonisation of the mucous membrane of the gall-bladder, or with so-called "electrical" or "electrocholecystectomy" where, instead of the scalpel, the diatherm cutting knife is used.

4. A prerequisite to the achievement of satisfactory results is a patent common duct. An occluded cystic duct from any cause is an indication for this operation.

5. Experimental studies have shown that any method of carbonisation, such as fulguration, Paquelin, and electrocauterisation predisposes to hæmorrhage, thrombosis, and embolism. Such cauterisation will not destroy pathogenic micro-organisms in the depths of the affected gall-bladder wall. The operation here described is free from these drawbacks and effectually accomplishes destruction of

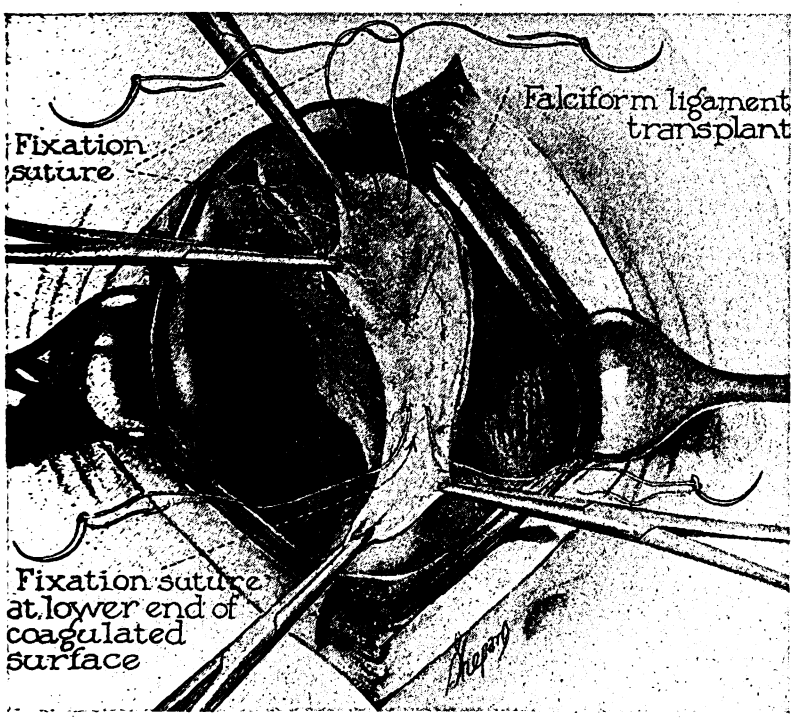

FIG. 7.—Note borders of the electrocoagulated area approximated with fixation suture. Additional interrupted sutures of fine catgut approximate the borders of the electrocoagulated zone along its entire extent. The mobilised falciform ligament is fixed over the closed electrocoagulated surface. Note placement of sutures.

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the entire thickness of the gall-bladder wall and, if indicated, also the gall-bladder bed. The surgeon has under control the degree of penetration he wishes to accomplish. Whitaker (1935) states: "The method of Thorek emphasizing contact coagulation to considerable depth seems preferable to fulguration. . . . I am grateful to Thorek for the distinction and wish to emphasize the necessity for real contact coagulation. . . ."

6. The ligamentum falciforme hepatis is used as a free graft, its serous structure covers sutured or raw surfaces to great advantage, thus reinforcing and protecting the areas concerned against seepage and safeguarding the processes of repair.

7. Electrocoagulated areas of intra-abdominal organs tend to heal by encapsulation. They do not interfere with wound healing. On the contrary, they heal promptly when the wound is closed securely. Therefore drainage is not only undesirable but is distinctly deleterious. Many patients succumb because of drainage. It prolongs the healing process and predisposes to complications. The operation described eliminates the necessity of drainage and its unpleasant sequelæ.

8. The thesis here presented deals with diseases of the gall-bladder. It must be stated, however, that where choledochostomy or hepaticostomy is indicated, these may be done, in conjunction with my procedure. Experimental studies showed that the implanted falciform ligament over the obliterated gall-bladder bed forms sufficient protection and does not interfere with a Kehr, Orr or similar drainage-tube.

9. Whereas the global mortality of removal of the gall-bladder by the scalpel method in complicated cases still ranges around 10 per cent. or more, the mortality in the series of 342 unselected cases here reported was about one-half of 1 per cent.

10. Electrosurgical cholecystectomy or electrocholecystectomy, so-called, is an entirely different procedure; it is nothing more than classical cholecystectomy in which the electric cutting knife is substituted for the scalpel. It has contributed nothing to the improvement of the old method and has added the danger of explosion by sparking or fulguration. Drainage adds to its drawbacks.

11. Many decades ago attempts were made to destroy the gall-bladder with carbolic acid and other escharotic substances. This is an antiquated procedure and quite ineffective, acting only superficially, demanding prolonged periods of drainage and often leading to fistulisation.

12. A thorough understanding of the principles involved in this technique are essential to the successful performance of the operation here described. The tyro or the inexperienced cannot expect results obtained by serious workers. In speaking of electrosurgical resection of the prostate J. McCarthy recalls that it is not a "procedure for amateurs" or to be practised as "a hobby." The same applies to electrosurgical obliteration of the gall-bladder. It exacts careful technique and meticulous attention to detail.

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VITAMIN-C OUTPUT IN DIET TREATMENT OF RHEUMATOID ARTHRITIS

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During the last 18 months we have been studying the effects of a raw vegetable and fruit diet on various rheumatic conditions. The results of the therapeutic trial have already been reported by one of us (Hare 1936).

The description of the diet as an unsalted, raw, vegetable and fruit régime is not really accurate, since during the period of strict dieting each patient received, in addition to the fruit and vegetables, approximately a pint of milk, 3 oz. cream, 2 oz. olive oil, and ¾ oz. of uncooked rolled oats a day. Later, as an intermediate diet, the animal protein was increased by the addition of 2 eggs, 1½ oz. cheese, and 2 oz. meat *or* fish daily; no bacon or salted meat was given. Even then the diet differs from an ordinary mixed diet by the very high proportion of uncooked fruit and vegetable and the negligible amount of sugar and all forms of cereals. For details of the diet, the reader is referred to the original paper (1936).

CASE REPORTS

Biochemical tests were carried out in 6 cases of rheumatoid arthritis with a view to determining the effective factor in the diet. In this the two most striking variants from an ordinary mixed diet were the abnormally high vitamin C and the abnormally low sodium-chloride content.

It is not proposed to discuss any of the chemical investigations except those related to the estimation of the vitamin-C intake and output, and the sodium-chloride output.

Case 1.—A man, aged 28, with slight rheumatoid arthritis, affecting chiefly feet and hands, onset 12 months before admission. Had lived in damp new cement house, unable to feed himself properly recently.

On admission—(May 28th, 1937). No evidence of general toxæmia except loss of weight. Very little visible deformity, but slight rheumatoid changes in small joints of hands, spindle-shaped swelling on 2nd and 3rd fingers,

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and feet which were hot and painful. Walking painful. Septic tonsils.

Progress.—Occasional temperature of 99° F. in first three weeks of treatment. June 11th: strict diet. June 25th: intermediate diet. Slow improvement. (Chart 1.)

On discharge (July 28th).—There was no swelling, redness, or œdema of any joint. Grip strong. Some stiffness of left elbow and shoulders.

CASE 2.—Man, aged 45, who had slight rheumatoid arthritis, chiefly affecting the small joints of the hands. Onset two months before admission with pain in joints and fever. He had lost weight (very tall and very thin). History of rheumatic endocarditis.

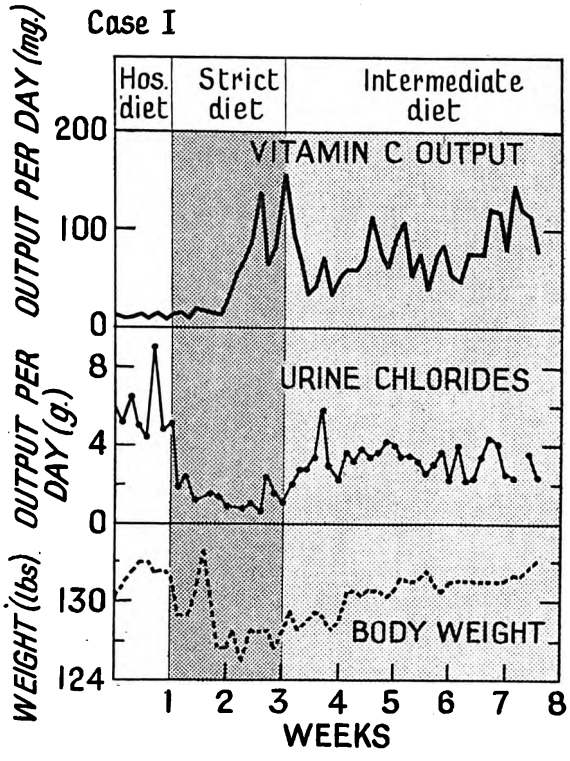
On admission (March 19th, 1937).—No evidence of general toxæmia except loss of weight. No rise of temperature or pulse-rate. Slight peri-articular swelling of metacarpophalangeal and phalangeal joints, no gross deformity. Wrists, slight swelling and painful. Elbows stiff. Knee and feet movements good, no swelling or pain. Old rheumatic valvular lesion. Mitral stenosis. Blood pressure 110/58 mm. Hg.

Progress.—April 1st: put on ascorbic acid, 400 mg. a day, and vitamin A. April 14th: strict diet added. April 24th: pains varying from day to day. April 28th: intermediate diet. May 12th: improved; feels very much better. (Chart 2.)

On discharge (July 22nd).—Walking, all movements without pain. Grip much improved. To continue diet. Sept. 5th: keeping well, still on diet; has returned to work.

CASE 3.—Man, aged 28, with synovitis of left knee in March, 1937, and November, 1937. Tonsillectomy and tooth extractions in March with some improvement, but pain and swelling returned in knee and also pain in hips and sacro-iliac joints.

CHART 1



BLOOD CHEMISTRY

Weeks	1	2	3	4	5	8
R.B.C. (millions)	4·465	5·250	5·125	4·525	4·875	4·610
Cell volume (cubic μ)	82·80	82·00	81·80	83·90	83·00	82·30
Uric acid (mg. per 100 c.cm.)	3·47	4·14	3·73	3·32	2·50	2·54
Phosphorus („)	3·19	3·45	3·65	3·74	3·68	3·50
Calcium („)	11·10	11·55	10·70	10·30	10·60	11·25
Alkali reserve (c.cm. per 100 c.cm.) %	65·80	67·40	69·12	68·02	68·50	71·54
Sodium (mg. per 100 c.cm.)	325·0	325·0	325·5	324·0	325·0	325·0
Chlorides („)	339·3	339·3	348·9	356·0	347·7	356·5

On admission (June 22nd, 1937).—Poor, toxæmic looking. On the dole—wife and 2 children. Left knee swollen. Tender over both sacro-iliac joints. All movements of hip-joint limited by pain. Blood pressure 135/70 mm. Hg. Definite muscular rheumatism of trapezium, lumbar and gluteal muscles.

Progress.—June 23rd: knee-joint aspirated. July 9th: ascorbic acid, 400 mg. daily. July 21st: diet + ascorbic acid, 400 mg. daily. Slight improvement on diet; walking with ease.

Discharged himself, owing to loss of unemployment pay while in hospital.

CASE 4.—Man, aged 52, referred from Red Cross Clinic. Invalided out of the Army in 1917 for nephritis, said to have had no recurrence. He had suffered from rheumatism for three years, and had been continuously under treatment. Three periods of residential treatment, including Bath, Bognor, and Southport. He had vaccine, electrical treatment, radiant heat, &c., and was treated for positive complement-fixation test. He had been unable to work for 8 months before admission. The rheumatism was both muscular and arthritic. There was severe muscular stiffness and pain, especially of the neck and shoulder muscles. The joints affected were the wrists and small joints of the hands. There was but little swelling or deformity. X ray showed some atrophic arthritis of hands, left shoulder, and hips. There was slight disability of the hands, chiefly due to weakness, and gait was slow and stiff.

On admission.—Arteries tortuous and hardened; blood pressure 195/128 mm. Hg, 170/120 after a week's rest. No wasting or anæmia or rises of temperature or other evidence of general toxæmia. Later he complained of pain in one groin associated with enlarged glands. This was persistent and hindered his walking. Seen by surgeon who advised no interference.

Progress.—Jan. 26th: ascorbic acid, 400 mg. daily. March 10th: strict diet and sodium chloride capsules, 5 g. March 23rd: strict diet, no salt; good improvement. April 7th: intermediate diet.

On discharge (May 7th).—Gait normal. No acute swelling of any joints; some painful gland in right groin. To continue diet at home.

Readmission 5 weeks later (June 28th) with severe relapse. He had been cutting wood, washing paint, &c., and had *not* kept to diet. Gait very painful. Swelling of metacarpophalangeal joints, phalangeal joints and ankle-joints. Pain in knees. Blood pressure 200/137 mm. Hg. Progress on diet good, but he was troubled with painful glands in right groin.

Discharged (July 29th), once again free from signs of active disease.

CASE 5.—Man aged 43. Severe progressive rheumatoid arthritis, with muscular pain, stiffness, and much wasting.

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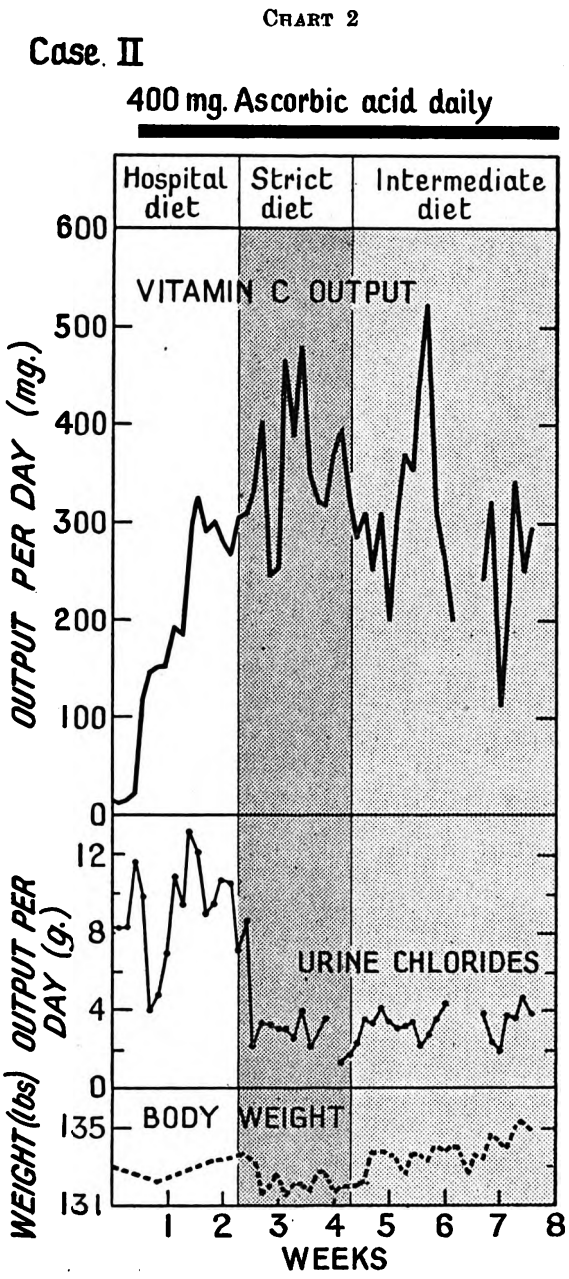
CHART 2



knees, ankles, and feet. Rheumatic nodules on elbows. Unable to move hands and feet on account of pain and stiffness. Enlarged and tender inguinal glands.

Radiograms show osteo-arthritic changes. Condition in metatarsal phalangeal joint suggests gout. Blood pressure 100/60 mm. Hg.

Progress.—He was in hospital 6 weeks on other treatment without improvement before diet was tried. Enlarged tonsils and sore-throat developed within 10 days of admission. April 23rd: ascorbic acid, 400 mg. daily; hospital diet. May 7th: strict diet with 15 g. sodium chloride and ascorbic acid. May 28th: strict diet without salt, with ascorbic acid. June 11th: intermediate diet. (Chart 3.)

On discharge.—Condition much improved. August 3rd: tonsillectomy; no exacerbation of rheumatic symptoms.

CASE 6.—Man, aged 67, with multiple arthritis, coming on in July, 1936, after getting wet through. Health had been good until 2 or 3 years previously. Aching pain in chest radiating to arm and flatulence in 1933.

On admission.—No evidence of toxæmia. Pain and stiffness of joints. Afebrile from 3–10 days in hospital. Radiograms: severe osteo-arthritis lower cervical spine; all joints of hands, acromio-clavicular joints, and knees show some changes. Wassermann reaction and Kahn negative. Blood pressure 110/86 mm. Hg.

Progress.—Movements more limited and joints more painful before any treatment started. Temperature occasionally 99° F. April 13th: ascorbic acid, 400 mg. daily. April 19th: joints became stiffer and more painful. April 30th: diet I cooked and vitamin C; worse, effusion in left knee. May 14th: strict rheumatic diet; for the first week movement of joints improved and painless. May 17th: warmed milk added. May 20th: joints swollen. May 28th: intermediate diet with 1½ pints of milk given for one week. Effusion in olecranon bursa. Stiffness and pain increased. Febrile 99°–100° F.

He became on the whole progressively worse, but it was impossible to keep him strictly to the diet because of the condition of his mouth. (Tongue red, dry, and fissured.)

COMMENTS

All 6 cases were observed during a preliminary period when they were on the usual full hospital diet. After this Case 1 was given the strict raw vegetable and fruit diet for 2 weeks, followed by 5 weeks on the intermediate, and no extra ascorbic acid was added. All the other cases had hospital diet + vitamin C before further dietetic changes.

Cases 2 and 3 were given ascorbic acid, 400 mg. per day throughout the diet changes. Case 3 discharged himself after 2½ weeks owing to financial difficulties at home. Case 4 was given ascorbic acid, 400 mg. daily, until the diet was started. He was kept on the strict diet 4 weeks. For the first 2 weeks sodium chloride was added, and for the 3rd and 4th weeks he had strict diet only, and then went on to the intermediate diet for 4 weeks. Case 5

Weeks	1	2	3	4	5	8	11
R.B.C. (millions)	3·810	4·010	3·975	4·380	4·485	5·200	5·210
Cell volume (cubic μ)	89·80	92·20	93·00	90·20	89·30	87·90	88·90
Uric acid (mg. per 100 c.cm.)	3·74	2·63	2·72	3·98	4·34	3·77	4·72
Phosphorus („)	3·45	3·25	3·85	3·79	3·79	3·36	3·70
Calcium („)	9·40	12·35	11·40	11·45	11·20	11·70	9·80
Alkali reserve (c.cm. per 100 c.cm.) %	69·55	72·30	71·96	69·90	—	69·40	73·42
Sodium (mg. per 100 c.cm.)	325·5	325·0	326·0	327·0	325·0	324·0	323·8
Chlorides („)	363·7	363·7	377·4	340·2	362·2	357·3	343·2

This began 12 months before admission—unable to work for 12 months.

On admission (March 26th, 1937).—Patient confined to bed. Very emaciated. Temperature normal. Pulse-rate normal. Hæmoglobin 78 per cent. Joints affected: shoulders, elbows, wrists, and small joints of hands, also

was given ascorbic acid throughout, and since he had, while in hospital, a streptococcal throat infection with ear involvement, relieved by Prontosil treatment, he was also given vitamin A. The first 2 weeks on strict diet, he had added sodium chloride, followed by 2 weeks without added sodium chloride before proceeding to the

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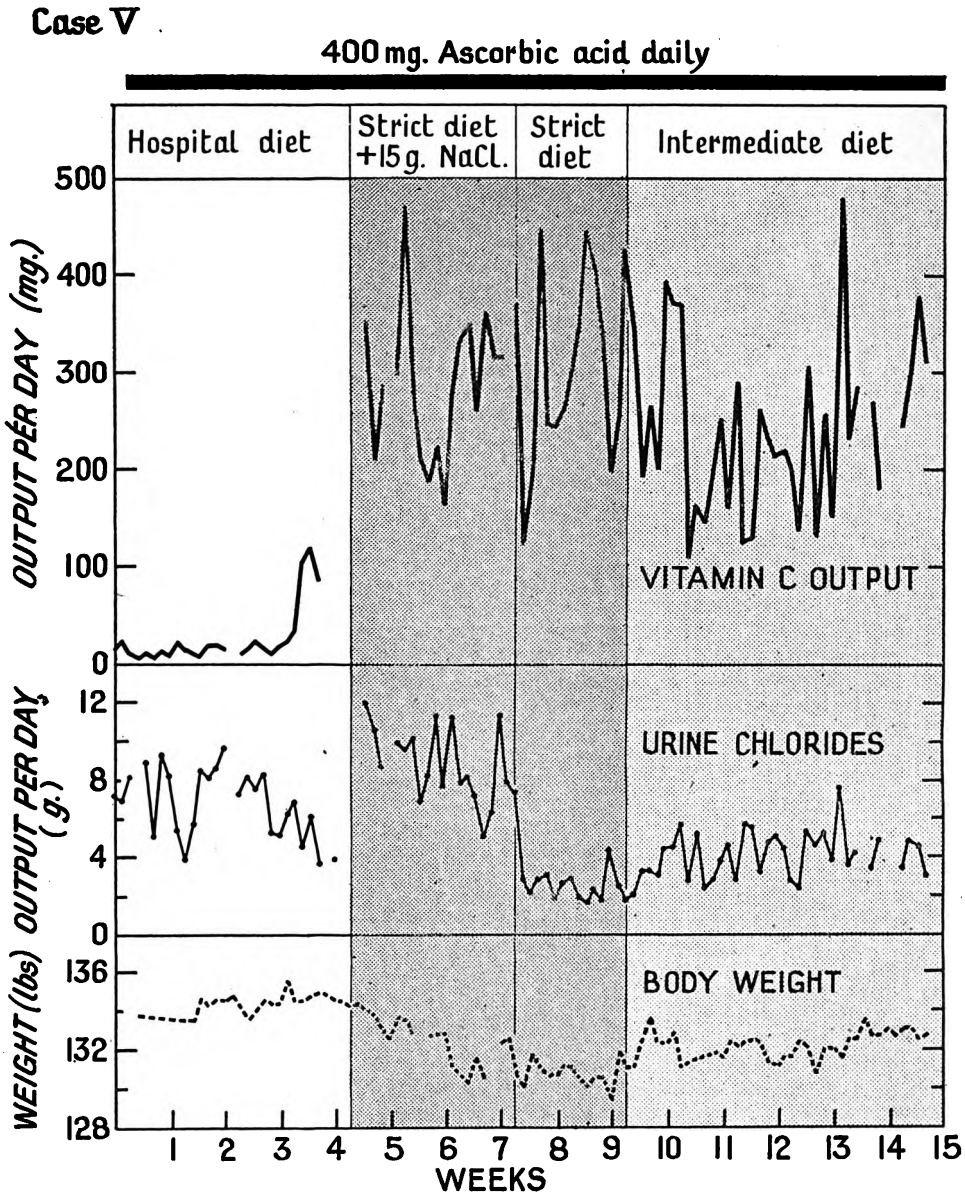
intermediate diet, which he was given for 6 weeks. Case 6 was given ascorbic acid throughout, and here the strict diet was cooked. No capsules of sodium chloride were given, but latterly traces were allowed as the diet otherwise was so unpalatable. This cooked strict diet was followed by 2 weeks uncooked strict diet. He had trouble with mouth and teeth, and was given throughout extra milk. Throughout the time of investigation he had shown an evening temperature of 99°–99·4° F. for three or four evenings a week. When the diet was increased (intermediate diet) his temperature remained for 4 days between 99° and 100° F., so the investigations were stopped and the patient put on a febrile diet. This case was deemed a failure, because it was not possible to keep to the diet.

Output of vitamin C in the urine during all these periods was estimated daily* (Johnson and Zilva 1934). The intake was assumed to be approximately that present in the fruits and fruit juices and roots taken. The ascorbic acid content of each was estimated, and these values used throughout the tests. During the preliminary period on the hospital diet all 6 cases had a very low vitamin-C output (see Charts for details of Cases 1, 2, and 5), the highest daily average being only 14·9 mg., and the lowest 2·22 mg. per diem. One patient with an average daily output of 12·7 mg. had been under treatment in hospital for 4 weeks before the tests were started. According to the usually accepted views (Schultzer 1936, Archer and Graham 1936) these figures indicate a condition of incipient scurvy. The excretion of ascorbic acid rose in all the cases receiving 400 mg. of ascorbic acid from the daily average of under 15 mg. to the maximum value ranging from 200–320 mg., but the length of time

CHART 3



Weeks	1	2	3	4	5	6	7	8	9	10	11	12	14
R.B.C. (millions)	5·070	4·940	4·810	4·790	4·820	4·950	4·830	4·660	4·820	4·835	4·859	4·920	5·005
Cell volume (cubic μ)	80·00	82·00	83·50	85·00	80·20	81·00	83·00	83·40	83·00	80·80	80·20	80·20	81·50
Uric acid (mg. per 100 c.cm.)	1·70	1·92	3·19	2·45	3·08	2·70	2·62	2·88	2·31	3·16	3·01	2·67	2·14
Phosphorus (mg. per 100 c.cm.)	3·33	3·80	3·68	3·68	3·90	3·27	3·40	3·36	3·85	3·80	3·32	3·67	3·70
Calcium (mg. per 100 c.cm.)	10·30	10·20	10·70	10·80	10·80	10·20	9·30	10·30	9·10	9·20	12·40	10·60	10·20
Alkali reserve (c.cm. per 100 c.cm.) %	—	66·20	58·90	61·65	59·50	—	58·90	60·00	65·80	65·76	66·10	64·82	66·26
Sodium (mg. per 100 c.cm.)	328·6	329·2	328·9	327·9	329·5	—	329·9	328·9	328·0	327·4	327·7	328·3	328·0
Chlorides (mg. per 100 c.cm.)	352·3	359·1	359·1	339·1	362·2	—	366·1	356·2	351·3	345·8	339·3	352·1	347·7

* Each sample was titrated as soon as it was obtained.

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before these high values were reached varied greatly from case to case.

In Cases 3, 5, and 6 it took 4, 5, and 8 days respectively before the excretion rose above the prescorbutic level of 20 mg. per day, and even after that the rise was slow, indicating a severe degree of desaturation. In Cases 2 and 4 the output rose on the 1st and 2nd day, and both cases reached a much higher level.

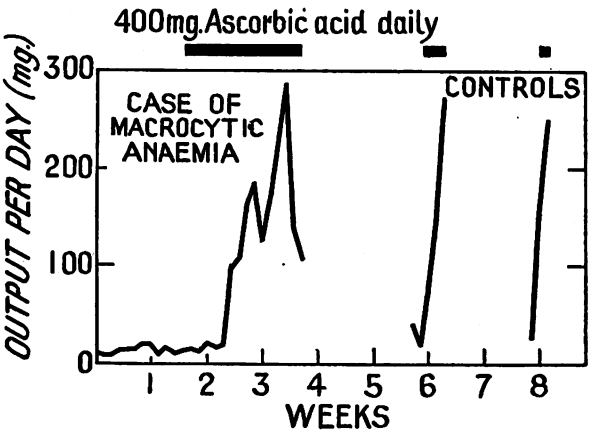
The delay in excretion in Cases 3, 5, and 6 may have been partly caused by the presence of recent septic foci.

Case 5 had had a recent attack of tonsillitis and piles, but in the other two cases no septic foci could be found.

Case 1, treated with diet only, took 8 days to show any increased excretion of ascorbic acid, and took a further 5 days before the excretion was above 100 mg. in the day. The highest value reached was 165 mg. on the 14th day of strict diet, and on the intermediate diet the values fell at first, finally, after 5½ weeks, to reach a level of 80–140 mg. per day, the approximate ascorbic acid content of the diet being 116–160 mg. per day.

It is interesting to note that Case 4, who was given the ascorbic acid for 2 weeks only, previous to the strict diet,

CHART 4



became balanced on the intermediate diet at the same level (80–140 mg. per day) during the 1st week.

In all the four cases that were given ascorbic acid throughout, there was a large increase in the ascorbic acid output directly the strict diet was started. This would be expected if the patients had become saturated by the preliminary administration of ascorbic acid.

The sodium values follow the chloride values very closely and the total output was estimated in all the patients except Case 3, and it will be seen from the charts that the chloride output falls to approximately 2 g. a day within 48 hours, and remains low throughout the strict diet to rise a little on the intermediate diet—i.e., with the addition of meat, egg, and bread in small quantities.

Controls.—To find healthy controls in hospital is difficult, and one patient tested had a macrocytic anæmia and had been in hospital many weeks (Chart 4).

During this time, every conceivable type of treatment for his anæmia had been tried without success. His vitamin-C output is shown (Chart 4), and it will be seen that the excretion did not rise until after 7 days, but before this, the blood count started to rise, and the patient's condition rapidly improved. On questioning him afterwards, it was found that he had been put on a diet by his doctor outside to cure his indigestion, and the diet lacked any food containing vitamin C.

The other two controls whose charts are shown (Chart 4), are those of healthy men living in hospital.

DISCUSSION

The average urinary excretion of normal adults on a good mixed diet appears to be about 30 mg. per day. On the hospital diet and presumably on the diet of the poorer income groups of the population, the daily excretion is below 15 mg., a value usually accepted as suboptimal and indicating a condition of incipient scurvy. From the charts it is clear that the experimental diet has a much higher vitamin-C content than even the so-called good diet, and so results in a much higher daily urinary output. The value of a preliminary period during which the vitamin-C reserves of the body are filled up by the daily administration of large doses of vitamin C is shown by the higher levels of vitamin-C output of cases so treated.

Most rheumatoid arthritic cases are obviously unsaturated, and there would appear to be some factor other than the antecedent deficient diet causing this effect. Varying with the severity of the condition, there was much delay in obtaining both a rise and saturation—this difference is still greater when compared with the finding in the control cases who received similar doses of ascorbic acid after a preliminary period of hospital diet.

These results are in agreement with those of Greenberg, Rinehart, and Baker (1936) who found in a group of cases of active rheumatoid arthritis uniformly low ascorbic acid blood values, many of which cases were refractory to treatment with vitamin-C. The same authors and Harris (1937) have also shown that in acute rheumatic fever the vitamin-C content of blood and urine is low, and they too require large doses of vitamin C to bring these values to normal. Similar results are found in other infections (Harris 1936).

There was undoubtedly a very definite clinical improvement in all the patients on the high vitamin-C intake, but though these findings and those of other workers suggest very strongly that, though these rheumatic conditions are in some way related to a condition of vitamin-C unsaturation, it is impossible to state that the improvement is directly due to the increased vitamin-C intake. It may be found on further investigation that the low sodium-chloride output is of definite significance. It is certain that the low chloride intake is responsible for the loss of fluid round the joints; at the same time no consistent changes were present in the blood sodium chloride, the normal balance being kept by the loss of fluid. However, further work on the various salts of the blood are in progress.

CONCLUSION

1. Six cases on a high vitamin-C diet for rheumatoid arthritis have been investigated; one could not be kept strictly to the diet.

2. There was definite clinical improvement noticed in the other 5.

Our thanks are due to Dr. Annie Cunning who very generously financed the work, and to Miss Demery and Miss Cheek (Annie Cunning Scholars) who assisted in the investigation; also to Sister Mangan and Sister Brier who have supervised the patients in the wards.

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PREVALENCE OF SONNE ENTERITIS

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Several outbreaks of Sonne dysentery in institutions and similar communities have been recorded during the past few months. The disease is not confined to epidemic outbreaks in institutions, but is liable to occur endemically over widespread areas.

As was emphasised by A. F. Hurst and F. A. Knott in 1936,[1] the innocuous outcome and especially the short duration of this illness renders its occurrence very liable to pass unrecognised, and it is in general only when mass infection occurs that the expense of bacteriological investigation is undertaken and the diagnosis established. Hurst and Knott also pointed out that the condition was one of gastro-enteritis rather than of true dysentery, and with this our experience leads us to agree. In fact, the disease more closely resembles food poisoning, in the acuteness of its onset, the presence of vomiting in most cases, and the very transient nature of the illness. Although blood as well as mucus is usually present in the stools on the first or second day, this rapidly clears and there is nothing to suggest that permanent damage to the mucous membrane of the lower bowel occurs.

AN OUTBREAK IN A COLONY

In November, 1937, an explosive outbreak occurred among the male inmates of a colony for mental defectives in Wiltshire. One case occurred on the first day of the outbreak, three cases on the second day, twelve cases on the third day, and about thirty cases in all within five days among a total of about one hundred inmates in the infected wing. Experience shows that the incubation period of Sonne infections is very short (within a few hours), and there is little doubt that the infection was spread to some extent by personal contact. The symptoms were typical of such outbreaks, sudden onset of vomiting followed by severe diarrhœa with blood and mucus in the stools, severe prostration in some cases, and pyrexia in almost every case of 100°–103° F. Though blood and mucus were usual, cases occurred in which no more than a severe loose diarrhœa was present. Nearly all the cases showed recovery within three days, after which time the condition of the stools became normal.

Although recovery was so rapid, the condition of many of the patients during the acute stages gave rise to considerable alarm, and in one case the prostration was so severe as to give rise to the greatest anxiety and necessitate urgent action. Treatment in general was merely sedative, and gave excellent results. There did not appear to be any indication for the use of salines or of specific therapy. The ages of the persons affected varied from 16 to 40 years, and there did not appear to be any tendency to affect any particular age-group.

The outbreak was dealt with very promptly by Dr. D. H. H. Thomas, medical superintendent of the colony, and there is no doubt that the effective measures taken by him prevented a general spread of the infection throughout the colony. The sufferers and convalescents were rigidly segregated, and a search of the stools of the apparently healthy was made at once to detect carriers. Two carriers of *B. dysenteriæ* Sonne were identified among those who had not been affected with the disease, and it is significant that one of these was regularly employed in washing up dishes and plates at meal times. The segregation of these two persons along with the other sufferers brought an immediate end to the outbreak; only one case occurred subsequently, and this was directly traced to a malfeasance by a segregated ex-patient.

It is of interest to note that plates inoculated with fæces during the first twenty-four hours of the illness showed an almost pure growth of *B. dysenteriæ* Sonne, whereas those taken after the illness had lasted three days often showed only an occasional colony among the usual coliforms—in fact in some cases it was very difficult to prove the presence of *B. dysenteriæ* Sonne on the third day. *B. dysenteriæ* Sonne seems to be very rapidly crowded out by other intestinal habitants after the fæces have been passed, and in our experience plates should be inoculated at least within two hours of the stool being passed if reliable results are to be obtained. These factors suggest a further reason whereby cases may be missed, even when bacteriological investigation is utilised.

CASES OUTSIDE THE COLONY

While the usual investigations to determine the origin of the outbreak were being undertaken, it was decided to ascertain if the disease existed among the civilian populace outside the institution, since sporadic cases of diarrhœa were understood to be prevalent in this part of England at this time both in urban and in rural districts. The public health authority and the practitioners of Wiltshire are fortunate in enjoying a considerable measure of coöperation in the exercise of their respective functions, and practitioners were at once circularised by the county M.O.H., and their attention drawn to the desirability of investigating cases of sporadic diarrhœa. As a result of laboratory examination of fæcal specimens from about thirty such cases showing suspicious clinical symptoms, six persons suffering from Sonne infection were detected. These persons resided in different districts mainly in the south of the county and a neighbouring county, and were separated from one another by a distance of over fifty miles. Their ages reached from 9 months to 40 years, again demonstrating that the disease is by no means confined to infants and the young. In none of these districts had there been anything in the nature of an epidemic, though cases of diarrhœa were said to be fairly common. It thus seems probable that the condition of Sonne enteritis is much more widespread, especially in the late autumn, than is generally believed, and that it is an entity to be borne in mind by practitioners even in the absence of any explosive outbreak in their district.

TECHNIQUE OF DIAGNOSIS

It should be noted that the plates from the fæces of the thirty sporadic cases of diarrhœa mentioned above were examined also for colonies of *B. dysenteriæ* Flexner, with negative results. This rather confirms our experience over some years that sporadic cases of *B. dysenteriæ* Flexner infection are not common in this part of England and, though occasionally met with sporadically, this latter condition is much more commonly endemic in asylums and similar institutions, while *B. dysenteriæ* Sonne is more likely to be endemic among the general population. In such cases of

[1] *Lancet*, 1936, 2, 1197.

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B. dysenteriæ Flexner infection as we have seen, the specific organism is a habitant of the lower intestine for a considerably longer period than two days.

It was our experience during the outbreak described, as it has been in the past in other outbreaks of food poisoning, that specimens of actual fæces are preferable for bacteriological examination to rectal swabs. It is doubtless easier to collect specimens by the latter method, especially from children and the mentally deranged; but the difficulties of laboratory diagnosis are considerably added to thereby, as litmus lactose plates inoculated from rectal swabs are liable to show numerous pale colonies of late-lactose fermenting or *B. alkalescens* types which may closely resemble colonies of dysentery bacilli in appearance; the investigation and subsequent rejection of these colonies involves a great deal of wasted effort, and may easily lead to the dysentery colonies being missed. It would appear that organisms of the alkalescens type are common habitants of the lower rectum.

BACTERIOLOGICAL PITFALLS

In addition to the reasons already given that may cause cases of Sonne enteritis to be overlooked—i.e., transient illness, early disappearance of the specific organism from the stools, and the confusion caused by other non-specific pale colonies on lactose plate cultures—there is another factor which may greatly add to the difficulties of laboratory confirmation. This is the tendency displayed by some strains of *B. dysenteriæ* Sonne to extremely early production of acid from lactose. The standby of the clinical bacteriologist in the investigation of all acute bacterial infections of the intestine is the fortunate fact that the specific organisms, though of various types, lack in common the power to produce acid from lactose, at any rate for some days. Consequently, it is only the pale colonies which grow on litmus lactose plates which are considered for further investigation as potentially dangerous; the red and pink colonies are rejected straightaway as presumptive coliforms of no pathological significance. The strains of *B. dysenteriæ* Sonne with which we have been working during the past month all tend to produce acid from lactose very early; even on solid media (litmus-lactose bile salt-agar) the colonies cannot be relied upon to remain pale for more than twenty-four hours after inoculation of the plates, and by the end of forty-eight hours they are very definitely pink. It is therefore essential to choose the exact moment for picking off suspected colonies for examination; up to twenty-four hours all colonies are too small and undifferentiated to permit of reliable investigation, and if the selection is left much later, the *B. dysenteriæ* Sonne colonies will become pink and difficult to recognise from coliforms. The use of high titre "pure" specific antisera is absolutely essential for large-scale investigation of such outbreaks, and it is unfortunate that reliable and suitable sera are very difficult to obtain. The technique used by us follows that of Dr. W. M. Scott of the Ministry of Health laboratory. It consists of picking off with a straight needle a portion of a suspected colony, rubbing this up on a glass slide in (*a*) a single small loopful of specific *B. dysenteriæ* Sonne serum, (*b*) a single small loopful of Flexner serum. Should the suspected colony be *B. dysenteriæ* Sonne, fine granular clumping is visible, usually to the naked eye but always with a hand lens, within a few seconds in the case of the specific serum, with no clumping in the *B. dysenteriæ* Flexner serum. The remains of a positive colony is then picked off on to an agar slope for full subsequent cultural and serological confirmation. This simple procedure enables great numbers of plates and colonies to be examined rapidly, and gives very accurate results. The difficulty with the sera usually available is that they are either not sufficiently specific, and so liable to give false clumping, especially when concentrated serum is used; or so diluted that although quite adequate for macroscopic sedimentation tests in tubes where appreciable quantities of bacterial suspension are used, they fail to show sufficiently rapid naked-eye clumping when used directly on a slide with minute quantities of the suspected organism. We have investigated more than a dozen outbreaks of food poisoning, due to salmonellas, using this method, and have always obtained a solution within forty-eight hours (usually within twenty-four hours), which has subsequently in every case been confirmed as accurate by the more lengthy routine methods. We would again emphasise, however, that the essential of the rapid method is the possession of highly specific antisera which will give sharp differentiation between, for instance, a Dublin and a Newport strain salmonella. We again express our gratitude to Dr. W. M. Scott and to the Ministry of Health laboratory generally for familiarising us with the details and exact technique.

We have pleasure in expressing our appreciation to Dr. C. E. Tangye, M.O.H. for Wilts county, and to Dr. D. H. H. Thomas, both of whom afforded us every facility and assistance in the investigation.

Clinical and Laboratory Notes

RECIPROCAL RHYTHM

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THE term reciprocal rhythm was first used by Drury (1924) in a case of nodal tachycardia to describe a mechanism of the heart in which a single impulse from the auriculo-ventricular node gives rise to two ventricular contractions. The impulse from the node passes down normally to the ventricle and causes it to contract. But the backward transmission to the auricle is so slow (retrograde heart-block) that after the auricular contraction the impulse is able to pass down again, and to reach the ventricle after that chamber has recovered from its refractory phase. So a second ventricular contraction results. Drury suggested that with the fast rate the conducting fibres might be partially refractory, and that some only might conduct the impulse back to the auricle while others might by that time have recovered sufficiently to conduct it forward to the ventricle.

A similar action had been noted under different titles by earlier writers in patients with nodal rhythm. The first example is a polygram by Wenckebach (1906). White (1915), who recorded the first electrocardiograms, suggested that the impulse-forming centre in the node might lie outside the ordinary conducting tract, and that the backward spread to the auricle and the forward spread down to the ventricle might not be along the same set of fibres. It must be remembered that all fibres in the auricle can conduct the impulse, and that there is no set path from the node to the ventricle.

CASE REPORT

A man aged 75 was seen with Dr. Mercer Jones on Sept. 26th, 1937.

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In June he had had a heart attack with "missed beats" at his home for which he was kept in bed a week. Otherwise his cardiac history was negative. On the previous morning he had been found to be orthopnœic with a regular pulse-rate of 180. The blood pressure was 150–80 mm. Hg. He was given Nativelle digitalin granules (gr. 1/240) every four hours, and by evening the pulse-rate was 170 with occasional dropped beats.

The following morning the pulse-rate was 155, the rhythm being regular except for periods of intermission when beats were dropped. The apex impulse was outside the nipple, and mitral regurgitation was present. The lungs were congested. An electrocardiogram (Fig. 1) shows a tachycardia of doubtful origin, probably auricular flutter superimposed upon a left bundle-branch block. At noon on that day the pulse-rate was 120 and totally irregular. By the evening it was 80 and regular except for occasional extrasystoles. Digitalis was reduced to one tablet twice daily, and was stopped on Sept. 29th.

In order to confirm the diagnosis of auricular flutter, strongly suggested by the mode of termination of the paroxysm, a second electrocardiogram was taken on Oct. 4th (Fig. 2). This shows the anticipated bundle-branch block, but in addition the P waves are abnormal. A regularly recurring cycle of five beats runs through the record. It is continuous except in lead I where it is broken by a ventricular extrasystole. One cycle only need be described. The third complex in lead II is a beat of nodal rhythm with an inverted P preceding the Q R S by 0·12 sec. In the next complex no P wave is visible, being buried in the Q R S. In the last complex of that lead an inverted P occurs shortly before the end of the T wave. The Q–P interval in this beat is 0·28 sec. In the second complex of lead III the Q–P interval is also 0·28 sec. In the third complex an inverted P occurs after the end of the T wave, the Q–P interval being 0·48 sec. The next Q R S is a response to this P, the P–Q interval being 0·28 sec. The beat is slightly premature, arriving after 0·76 sec. in contrast to a constant rate of 0·92 sec. for the other beats in the lead. The cycle recommences at the next beat.

The record shows therefore nodal rhythm with a gradually increasing retrograde heart-block — a reversed Wenckebach period. When the Q–P interval reaches 0·48 sec. a reciprocal ventricular beat occurs.

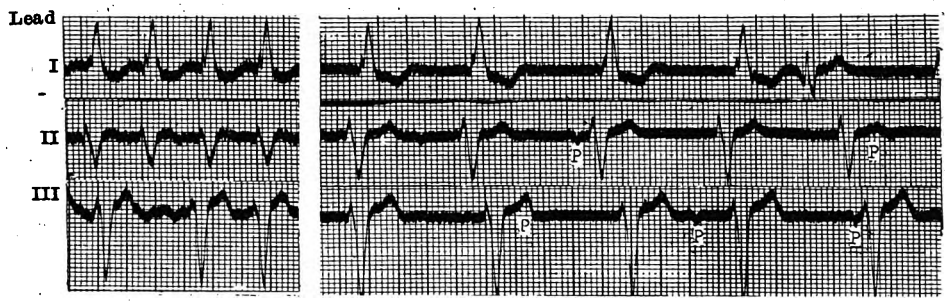

FIG. 1.—Sept. 26th: Auricular flutter and left bundle-branch block.

FIG. 2.—Oct. 4th: Left bundle-branch block, nodal rhythm with retrograde heart-block and reciprocal rhythm.

COMMENTS

In most of the recorded examples in nodal rhythm the reciprocal rhythm has taken the form of bigeminy. The Q–P interval is consistently long and the P is always answered. A gradual increase in the retrograde heart-block with an initial inverted P preceding the Q R S is rare. The original polygram of Wenckebach was of this type. Blumgart and Gargill (1930), out of four cases showing reciprocal rhythm, included one (No. 4), also with a cycle of five beats. Reciprocal rhythm occurred when the Q-P interval reached 0·28 sec. Heart failure was present. Dock (1928) reported another, but in his case the upright P waves suggest dissociation with interference as a more likely explanation of the arrhythmia. In the case now recorded the patient had recovered from his attack of flutter and was in his usual health.

SUMMARY

A case is described of nodal rhythm with retrograde heart-block and reciprocal rhythm following a paroxysm of auricular flutter.

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A MODIFICATION IN THE TREATMENT OF EXTENSIVE VARICOSE VEINS

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HON. SURGEON TO THE HOSPITAL

THE technique here described is a modification of the usual procedure of ligating the main vein for general or local varicosity of the long saphenous system, the object being to produce a thrombosis in the varicose veins (which have previously been made relatively empty) throughout their entire extent, and in continuity, by a single operation. The only special apparatus required is a needle 8–10 in. long which will fit a standard Record syringe. (The type used for splanchnic infiltration of local anæsthesia is convenient.) On the end of such a needle is fixed a copper ball ¼ in. in diameter through which the blunted needle passes.

Technique.—With the leg elevated, allowing a few minutes for blood to drain from the limb, the saphenous vein is exposed under local anæsthetic at the fossa ovalis and ligatured, leaving a second ligature just distal to the first; the vein is incised below the proximal ligature, whilst bleeding is controlled by tension on the distal one. The ball-ended needle is passed down the distal part of the vein to its full length, the rounded end allowing this to be done without fear of perforating the vessel wall. A 20 c.cm. syringe is attached to the needle and the vein is emptied as far as possible by aspiration, which procedure is further aided by massaging the limb in an upward direction. The ball-end prevents the wall of the vein being sucked against the lumen during this process. A second syringe containing 8 c.cm. of 5 per cent. sodium morrhuate is fixed to the needle and 4–5 c.cm., according to the size and extent of the vein, is injected under fair pressure, the remainder of the injection being

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continued more gently whilst the needle is withdrawn. The distal ligature is tied and the vein severed. The measures taken to reduce the vascularity of the limb are maintained for a few minutes after the operation has been completed, during which time the limb is massaged in a downward direction.

The patients are allowed up on the third day and are back at work in a week's time. Very little post-operative pain has been noticed. In all cases the varicosity has been gross, affecting the whole or part of the long saphenous system, and in some where the varicosity has been as extensive the thrombosis has been continuous from the fossa ovalis to the medial malleolus. The immediate results, both curative and cosmetic, have been very good. Recently 14 patients were examined who had been treated by this method 8–10 months previously. Policemen, bus-conductors, and a blacksmith were amongst their number. In all but one there was no visible evidence of varicose veins; in that case a small lump could be seen which had previously been an enormous varix. None of them had had any further trouble, and all were well satisfied with the appearance of their limbs.

The advantages of this modified technique are:—

1. That the operation can be performed in a few minutes under local anæsthetic. There is no need for the further injections that so often become tedious to both patient and surgeon.
2. The thrombosis takes place with the minimum of blood in the veins, which causes a more lasting obliteration and a much better æsthetic result.
3. The venous channels are thrombosed in continuity so that unobliterated portions of the vein do not remain communicating with the deep veins of the limb, which is so often the case where multiple injections have been used, and is a potent cause of recurrence.
4. The saphenous vein having been ligatured before the injection is made, there is no danger of the separation of any clot of appreciable size and of consequent embolism.

The type of case suitable for this line of treatment is the one in which there is generalised or localised varicosity of the long saphenous system, provided that the valves are incompetent and the deep veins patent as shown by the tests of Trendelenburg and Perthes. We may add that associated ulcers heal in a remarkably short time.

MEDICAL SOCIETIES

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

A MEETING of this society was held in Liverpool on Nov. 26th, 1937, with Dr. J. W. BRIDE, the president, in the chair.

Sulphanilamide in Obstetrics

Mr. BRYAN WILLIAMS (Liverpool) read a note supplementing his paper on the use of Prontosil in obstetrics read at Newcastle-upon-Tyne last June.[1] Unless there was vomiting that prevented the swallowing of large numbers of tablets he now gave sulphanilamide by mouth rather than by injection. Altogether, he said, he had treated 84 cases of puerperal sepsis. In 44 the hæmolytic streptococcus was not found, and he had no evidence that prontosil was of value in such cases. In 40 cases a hæmolytic streptococcus was isolated. In 19 of these, where the infection was localised to the perineum, vagina, and uterus, there were no deaths. In 10 cases where the infection involved the pelvic cellular tissue, peritoneum, veins, Fallopian tubes, or ovaries there were again no deaths. In the remaining 11 cases either septicæmia or peritonitis or both were present, and 6 were fatal; but in 5 of these 6 either the patient was extremely ill on admission or doses were given that were now known to be inadequate. No patient had died since his last report. He had also used the drug prophylactically, and had found no hæmolytic streptococci in 104 cases where it was given, whereas a hæmolytic streptococcus was found in 8 of 73 controls. The more important of the toxic effects of the drug were jaundice, acute hæmolytic anæmia, agranulocytic angina, skin eruptions, and neuritis. Cyanosis had been prominent, but in the more serious cases he had continued treatment in spite of it. It was clear that there had been a fall in the fatality of hæmolytic streptococcal infections since the introduction of these drugs, but at the same time there was evidence of a fall in the virulence of such infections in recent years. Nevertheless there was no doubt that sulphanilamide, in adequate doses, substantially lessened signs and symptoms caused by the hæmolytic streptococcus, especially when the patient was seriously ill with peritonitis or septicæmia. Indeed if this improvement did not occur, it could be assumed that a hæmolytic streptococcus was not responsible for the illness. Though there was no justification for the indiscriminate use of the drug, it was in his opinion valuable as a prophylactic. It should not be used as a routine.

Dr. S. B. HERD said that he had sometimes found that cases which did not respond at first to prontosil responded after a blood transfusion.—Prof. JOHN CHISHOLM (Sheffield) said that the drugs had been used a great deal at the Jessop Hospital, and the results had been comparable with those of Mr. Williams.—Mr. A. GEMMELL quoted a case in which there was a pyrexia apparently due to prontosil.—Mr. C. H. WALSH spoke of the possibility of idiosyncrasy.—Mr. J. W. BURNS had seen a case in which cyanosis persisted for a month.—Mr. T. N. A. JEFFCOATE thought that cyanosis depended on the patient and not on the dosage. He had seen pyrexia and jaundice following the use of sulphanilamide.

In reply Mr. WILLIAMS said blood transfusion had been carried out in many cases with evident improvement. The dose of sulphanilamide he gave was four half-gramme tablets 4-hourly; after a few days this was reduced by a third.

Toxic Hepatitis

Mr. C. J. K. HAMILTON (Liverpool) reported a case of "acute yellow atrophy."

The patient, aged 32, who had had a normal confinement in 1935, was admitted to hospital on August 10th, 1937, at the 36th week of pregnancy. A week previously she had had attacks of orthopnœa. On admission her temperature was normal but the pulse-rate was 120. She was drowsy and slightly jaundiced. The height of the fundus corresponded with 36 weeks, and there was some diminution of dullness over the liver.

A classical Cæsarean section was performed under local anæsthesia, and a living child (6 lb. 10 oz.) delivered. Intravenous 10 per cent. glucose saline was given by the drip method with 10 units of insulin in each pint. Abdominal distension increased and the jaundice became deeper. On the second day after delivery the jaundice was very deep and the patient nearly comatose. Liver dullness was absent, the temperature had now risen to

[1] See *Lancet*, 1937, 2, 83.

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104° F., and the patient had two rigors. She died on the third day after delivery.

The liver weighed 40 oz. and was yellowish. Section showed red areas of necrosis surrounded by areas of fatty degeneration. Microscopically there was necrosis and fatty infiltration of the liver cells in the central areas.

The infant was slightly jaundiced the day after operation. The jaundice increased on the second day, and paternal blood, and later serum, was given for the ensuing four days, during which the jaundice gradually cleared. Seen at about 11 weeks old, it was apparently well in every way.

Mr. Hamilton thought that the jaundice of the child was interesting. Dudley in 1901 had reported a case of normal delivery in which the child was born jaundiced.

Dr. N. B. CAPON spoke of the relationship between icterus gravis, anæmia gravis, and congenital œdema of the fœtus; cases seen in this country seemed to show erythroblastosis much less frequently than those recorded in America. Early treatment by intramuscular injection of human serum was of the greatest importance, and maternity hospitals should keep a supply of serum available for use in emergency. As soon as the child was out of danger, and the jaundice was subsiding, blood transfusions were of value to overcome the consequent anæmia.

Mr. C. H. WALSH reported a case seen at the same time as Mr. Hamilton's.

The patient was admitted at the 24th week of pregnancy, with right-sided pain and vomiting for the previous five days. There was a slight jaundice but her condition was fair. At a previous pregnancy she had had jaundice 7 weeks after delivery, but this had cleared up in a few days. The urine contained pus and *B. coli*. She was treated with calcium gluconate and glucose, and the membranes were ruptured to induce abortion. She was delivered on the following day and died two days later. Autopsy showed typical liver necrosis.

Mr. Walsh suggested that this was a case of toxæmia in which the toxin affected the liver primarily, with no damage to the kidneys. Toxic jaundice might be a terminal condition in some cases of severe toxic vomiting. Possibly a specific toxin was elaborated, which had a selective destructive effect on the liver cells in toxic jaundice.

Endometriosis

Prof. A. M. CLAYE (Leeds) reported the case of a woman of 30, who had complained of dysmenorrhœa and dyspareunia for several years, and had been married nine years without pregnancy. An indefinite mass was felt behind the uterus, and at operation in March, 1936, a chocolate cyst of the left ovary was found, which burst and was removed. The right ovary was enlarged and showed multiple cysts. Wedge enucleation was performed, and after the operation dyspareunia was relieved, and dysmenorrhœa much less. When seen again the day before the meeting she was 32 weeks pregnant. Prof. Claye's hospital records showed only two other examples of pregnancy after a conservative operation for endometriosis. He had met with endometriosis at Cæsarean section on three occasions. Bourne and Williams said that nearly half of the patients with endometriosis were sterile. This might be due to two kinds of ovarian dysfunction associated together. In some cases the adhesions in the tubes and in others the dyspareunia militated against conception. Where the disease was not very advanced, efforts should be made to leave some ovarian tissue to preserve the possibility of pregnancy. His impression was that the age-period of the disease was placed too highly by most authorities.

The PRESIDENT and Prof. MILES PHILLIPS (Sheffield) had each seen a case of endometriosis in which pregnancy had supervened. The latter thought that artificial prevention of pregnancy in early marriage might possibly be the cause of endometriosis.—Mr. ST. GEORGE WILSON was of opinion that many cases of chocolate cyst could not be demonstrated as endometriomata, and it was in these cases that pregnancy occurred.—Prof. LEYLAND ROBINSON, Mr. JEFFCOATE, and Mr. GEMMELL had all seen cases similar to Prof. Claye's.

In reply Prof. CLAYE said he thought the incidence of sterility was exaggerated.

Breech Presentation

Mr. ST. GEORGE WILSON showed a cinematograph film entitled a Method of Delivering the Trunk and Arms in Breech Presentation. He said that the *Journal of Obstetrics and Gynæcology of the British Empire* for August contained an article by Løvset of Bergen on shoulder delivery in breech presentation. The theory was that at a given moment the posterior shoulder was lower than the anterior shoulder owing to the inclination of the pelvis. When the posterior shoulder had got below the promontory of the sacrum, the body of the fœtus was rotated through 180°, and the posterior shoulder then came behind the symphysis and the arm appeared below the pubic arch. The arm was easily freed and the trunk rotated back again through 180°, when the remaining arm appeared under the pubic arch. These facts were demonstrated in Mr. St. George Wilson's film and he claimed (1) that the method was easy; (2) that displacement of the arms was an advantage rather than a hindrance; and (3) that the risk of laceration and sepsis was less as the hand was not introduced into the vagina.

Mr. BURNS thought the method had nothing to recommend it. There was a risk of breaking the fœtal neck by twisting.—Prof. PHILLIPS, Mr. GEMMELL, and Mr. GLYN DAVIES however all regarded the method as excellent and had used it for years. Prof. Phillips pointed out that it was originally adopted by Potter of Buffalo.

THE LANCET 100 YEARS AGO

December 30th, 1837, p. 495.

From a letter from a student of University College.

SIR:—The just and fearless manner in which THE LANCET has ever been devoted to the advancement of medical education, induce me to hope that you will continue to give your attention to the Medical School of *University College*. The nomination to the chairs in this School is entirely in the hands of the Council, and it gives me great pleasure to bear evidence to the fact that the majority of them are filled quite to the satisfaction of the students. . . . In the department of chemistry . . . the present Professor . . . although well-informed in his subject, and thus far highly qualified for the appointment, . . . is deficient in one essential at least, which is, perhaps, more necessary than even profound chemical research itself. In France, and throughout Germany, a clear and distinct enunciation, and a capacity for imparting information, are considered to be *indispensable* qualifications in a professor. In these points Professor Graham is exceedingly defective. He is by birth, and early association, so inveterately Scotch in his accent, as to be often unintelligible to his English auditors.

I endeavour to get as near as possible to him at lecture, yet I, day after day, leave the theatre uninformed on matters on which he discourses, as I am never able to follow him through a sentence of any length. . . .

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REVIEWS AND NOTICES OF BOOKS

Developmental Abnormalities of the Eye

By IDA MANN, D.Sc., M.B., B.S. Lond., F.R.C.S. Eng., Surgeon, Royal London Ophthalmic (Moorfields) Hospital; Ophthalmic Surgeon, Royal Free Hospital. Published for the *British Journal of Ophthalmology*. Cambridge: at the University Press. 1937. Pp. 444. 50*s*.

THIS work is an interesting sequel to a book on the development of the human eye written some years ago by the same author. In many respects the two books are complementary. This one is a monograph which deals with the application of embryology to the elucidation of certain clinical problems. Miss Mann refers abnormalities of the eyes to three main stages or periods of development: the germinal, the organogenetic, and the fœtal. She states that the time of appearance of a defect is no indication of whether it is or is not genic in origin, for its manifestation may be long postponed. In one group of congenital abnormalities the departure from the normal is that of disposition of parts only, no genic or chromosomal alteration having occurred; such defects are due to environmental causes (chemical, osmotic, or toxic), but it is impossible to determine their nature since the result of interference with growth during the organogenetic period is specific for the time at which the noxious agent acts. "Thus disorders of growth arising during the organogenetic period will produce, if early, deformities rather than arrests, if a little later, arrests associated with aberrant growth (deformity), and later still simple arrests or retardation; the type of abnormality is thus determined by the time of action and not by the nature of the agent. Diseases of the fœtus resemble those of the adult the more closely the later they occur." In discussing the ætiology of oxycephaly Miss Mann surveys theories advanced by other writers on this subject and presents a suggestive conception of her own. She maintains on good evidence that oxycephaly is a true developmental anomaly of germinal origin, a dysgenic condition manifested by a localised arrest in the development of the post-optic visceral mesoderm (maxillary process) which may fail to respond to the widening of the brain and may remain in a retarded atavistic condition, the process beginning during the organogenetic period.

Perhaps the best part of this admirable work are Chapters VI and VII on the iris. The text of this section contains much original work by the author, and she is able to draw material from her wide range of knowledge about comparative anatomy. The omissions are few; one that we noticed is in the description of Bourneville's syndrome, where there is no mention of adenoma sebaceum, an important clinical feature in this disease. Many of the illustrations drawn and painted by the author are reproduced in colour and show a wealth of informing detail. The three coloured illustrations of cerebromacular degeneration are particularly interesting, for they show the disease in its early stages. Unfortunately the pictures of the histological features of glioma (neuroblastoma) retinæ are poorly produced.

This is not an exhaustive survey of all the known deformities of the eye, and the author is well aware that her keen interest in certain problems has affected its balance. She admits also that further advances in embryological knowledge or new methods of examination may disturb many of the theoretical conceptions that she has elaborated; but these hypotheses enliven the work and its individual flavour is enhanced by the crisp enunciation of the opinions she holds and her grounds for holding them. Miss Mann is well qualified both as an embryologist and a clinical ophthalmologist to speak with authority on such matters, and the enthusiasm with which she has attempted to correlate developmental anomalies of different types with the various stages and processes of development in which they originated makes this book of exceptional value both to anatomists and to clinicians.

Diseases of the Blood and Atlas of Hæmatology

By ROY R. KRACKE, M.D., Professor of Bacteriology, Pathology, and Laboratory Diagnosis, Emory University School of Medicine; and HORTENSE ELTON GARVER, Instructor in Laboratory Diagnosis, Emory University School of Medicine. London: J. B. Lippincott Company. 1937. Pp. 532. 65*s*.

THIS atlas of blood disease is a portentous volume, of which no less than 24 pages are devoted to definitions of hæmatological terms. The arrangement of the letterpress is difficult to follow. The anæmias are discussed in a haphazard way—for instance, the different types of hæmolytic anæmia are described in widely separated chapters. In the table classifying the leukæmias, megakaryocytic leukæmia is included as a distinct type ranking with myelogenous leukæmia in importance, but is never mentioned or described again. The brief chapter on the bone-marrow by R. P. Custer is interesting, and in the account of the blood picture in normal laboratory animals much helpful information is collected from scattered sources. The discussion on hæmatological technique is comprehensive. There are 44 full-page colour plates in this atlas.

Blood-cells unfortunately are pretty things—their charm is a snare and a delusion. Until Whipple, Minot, and Castle, puritanical experimentalists, ignored the fine points of morphology, hæmatology was largely an affair of picture books. Men quarrelled over the nomenclature and genealogy of blood-cells but both the ætiology and the therapeutics of blood diseases remained obscure. Hæmatology to-day is alive because it has become an experimental science. The increasing number of elaborate hæmatological atlases is therefore to be deplored because they inevitably lay emphasis on the less important aspects of the blood dyscrasias; and it is unlikely that students, clinicians, or research workers will learn much of value from this one.

Story of a Great Hospital: The Royal Infirmary of Edinburgh, 1729–1929

By A. LOGAN TURNER, M.D., LL.D., Hon. F.R.C.P. Edin., F.R.C.S.E., Consulting Surgeon, Ear, Nose, and Throat Department, Royal Infirmary, Edinburgh. London and Edinburgh: Oliver and Boyd. 1937. Pp. 406. 10*s*.

THIS book has much more than local interest, for Dr. Logan Turner traces clearly the development of the voluntary hospital in Britain, showing how the Royal hospitals in London helped to bridge the gap between the monastic hospital and the voluntary subscription movement of the eighteenth century. But its chief concern is of course with Edinburgh. The

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"Father" of the Edinburgh medical school was John Monro, who in common with many Scottish students of his period derived inspiration from his studies at Leiden. His son, Alexander Monro, along with other founders of the school, worked with Boerhaave, and Dr. Turner points out that the emphasis which Boerhaave laid on clinical teaching has remained a lasting feature of the Edinburgh tradition.

The gradual development of the Royal Infirmary provides a story of absorbing interest, and the wisdom and courage of its managers in meeting the ever-changing and increasing demands made on the institution is impressive. The provision for wounded soldiers after the '45 rising; the beginnings of hospital midwifery; the provision of a public bath-house in 1756; the threatened expulsion of James Syme from the staff; the reason why John and Charles Bell left Edinburgh; the power of John Rutherford (Walter Scott's grandfather) in the school; the influence of the Edinburgh methods of teaching on the developing American colleges; and the personalities of Simpson, Syme, and Lister, are among the matters discussed. The later pages are concerned with the astonishing developments of the last fifty years, and at the end of the book are tables illustrating the growth of the hospital, and lists of former and present members of the staff. The illustrations include portraits and prints of old Edinburgh buildings. The book is beautifully produced.

Trauma and Disease

Edited by LEOPOLD BRAHDY, B.S., M.D., Physician in Charge of Industrial Diseases and Accidents in the Office of the Corporation Counsel of the City of New York; and SAMUEL KAHN, B.S., M.D., Medical Examiner in the Bureau of Workmen's Compensation of the Department of Labor, State of New York. London: Henry Kimpton. 1937. Pp. 613. 35s.

THE temptation to trace a causal relationship between the occurrence of an accident and the subsequent onset of disease, however much later, is a very old one. But the doctrine of proximate cause as exemplified by the relation of trauma to disease has become in these days a much more fertile source of litigation than it used to be. The counsel attempts to earn the fee marked on his brief by drawing lurid pictures of the osteo-arthritis that is certain to follow the most trivial mishap to bone or joint; every strained back that reaches the law courts is an incipient spondylitis deformans; and traumatic epilepsy and insanity are almost equally certain to follow a blow on the head. An authorised treatise on trauma and disease has long been needed, and this one was well worth waiting for. It would of course be impossible to survey the field in 600 pages, but the principles here laid down are sufficient to guide the examiner in most problems likely to confront him. The authors have bravely tackled the subject from its more difficult angle. It is easy to argue from trauma to disease; it is not so easy to start with disease and then trace back "bridging symptoms" to a specific trauma. But this is where one has to start in practice, and the book is made much more valuable by this approach.

Three groups of diseases are here considered in relation to trauma:—

1. Those that are practically always the direct result of trauma such as fractures. This group is not discussed in detail in the book.

2. Those which are never the result of a single trauma. Excluding diseases in which a traumatic origin is out of the question (e.g., measles) there are others, such as colloid goitre or Köhler's disease of the metatarsals, in which there might be a doubt and the evidence must then be carefully gathered and weighed. If as the result of such an investigation the conclusion has been reached that trauma is never an ætiological factor, and the disease is placed in the second group, the question of causal relationship between the trauma and any specific case of this disease need not arise.

3. Those which usually develop without trauma but in which trauma may be a causative factor—angina pectoris, kidney abscess, exophthalmic goitre, and so forth. The relation of trauma and disease in this particular group must be considered separately in each case.

Experimental evidence can sometimes be brought to bear on the connexion between trauma and some specific disease; this is of course much more valuable when it is positive, for negative results can hardly disprove such a connexion. Statistics are obviously most useful but they lead to fallacious conclusions unless interpreted by an expert. For example, in a series of 431 cases of glioma reported by Dr. Kernohan a history of injury was given in 13·4 per cent. In a control group of 200 presumably normal persons there was a history of injury to the head in 35·5 per cent. Few would defend a conclusion from such figures that injury to the head decreases the likelihood of the occurrence of cerebral tumour; but arguments almost as absurd have been solemnly enunciated and even gained currency. The sort of information in this book that will be found really useful is that which records the later history, for example, of a large group of cases of injury to the peripheral nerves during the late war. Not a single instance of paralysis agitans, multiple sclerosis, or progressive muscular atrophy (or for that matter any complicating neurological disease) was found among them. The writer of this section adds: "With the exception of residuals of direct trauma to the brain, spinal cord, or peripheral nerves, I do not recall one instance of disease of the nervous system that I can attribute solely to trauma."

Amongst the 23 contributors there are some rather disconcerting differences of opinion. Discussing trauma and disease of the gastro-intestinal tract B. B. Crohn quotes the four postulates of Liniger and Molineus for traumatic ulcer of the stomach as a fair beacon or guide to those considering all questionable cases. The postulates are: (1) that no known disease existed before trauma; (2) that the trauma be sufficiently severe to act as a causative factor; (3) that the trauma be immediately followed by active symptoms of the disease; (4) that the condition appearing after the trauma present the clinical symptoms of the disease alleged to have been produced and be otherwise identical with it. Hugh Cabot on the other hand, writing on tuberculous infection of the kidney, says: "It may, I think, properly be held that any injury of sufficient severity to lower the resistance of the tissues of the kidneys may operate to produce the disease. Obviously such an injury need not be severe, need not be disabling and need not produce any obvious clinical symptoms such as hematuria, ecchymosis or visible bruising of the tissues."

Such conflicting theories cannot be put down to the fact that each refers to a different system of the body. The difference is more fundamental and shows that the subject of trauma and disease still bristles with difficulties. But most of the conclusions

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reached in this book are based upon common sense and logic. It is agreed that an opinion cannot always be categorical. This is not perhaps a book for the inexperienced witness, but the expert who realises his heavy responsibility in influencing the courts for or against the compensation of some victim of circumstance will find much support in its pages.

Thorpe's Dictionary of Applied Chemistry

Fourth edition. Volume I (A–Bi). By JOCELYN FIELD THORPE, C.B.E., F.R.S., F.I.C., Professor of Organic Chemistry and Director of Organic Laboratories, Imperial College of Science and Technology; and M. A. WHITELEY, D.Sc., F.I.C., lately Assistant Professor of Organic Chemistry at the College. London: Longmans Green and Co. 1937. Pp. 703. 63s.

THE final volume of the last edition of "Thorpe's Dictionary" having appeared 10 years ago, the editors decided that the great progress since made in applied chemistry demands the issue of a completely new edition. They intend to publish a volume a year, and in order to allow for future advances they have adopted a mechanism whereby each volume will be used as a means of bringing a previous one up to date. The fact that there are nearly eighty contributors to this volume demonstrates their realisation "that the day of the universalist is past and that the work in any special field must be described by an expert thoroughly acquainted with his subject."

The dictionary contains a vast amount of pure chemical information; and pharmacology and biochemistry, as two of the most important forms of applied chemistry, are given a good deal of the available space. Of particular interest to those concerned with the medical sciences are the articles on alkaloids, amino-acids, vitamins B and C, bile, bile pigments, autolysis, anæsthetics, and barbituric acid. The editors aim to provide articles so written as to be understood by the ordinary cultured reader, and indeed some of the articles—e.g., on aerated waters, on alcohol, and on accelerated ageing (of protective coatings)—make fascinating reading for those quite ignorant of their subject. Not the least pleasant feature of the volume is the binding, which is coloured by the new dyestuff, Monastral Fast Blue.

Malaria and Ankylostomiasis in the Pregnant Woman

By G. A. W. WICKRAMASURIYA, F.R.C.P., F.R.C.S. Edin., M.C.O.G., Visiting Obstetrician, De Soysa Lying-in Home, Colombo; Tutor in Clinical Midwifery, Ceylon Medical College. London: Humphrey Milford, Oxford University Press. 1937. Pp. 179. 10s. 6d.

THE work is based upon the essay that gained the Katherine Bishop Harman prize for 1936. It contains a mass of detailed material collected upon a subject which, in view of its importance, has been singularly neglected. In Ceylon the bulk of the population suffers from malaria and ankylostomiasis, and it is not unreasonable to attribute the high maternal and infantile mortality in the island (20·6 and 173 per thousand respectively for 1934) to the ill health of the prospective mothers. On the whole Dr. Wickramasuriya holds ankylostomiasis to be a greater menace than malaria owing to its wider prevalence and its more insidious course; it may and often does coexist with malaria. That both ankylostomiasis and malaria render women more liable to the toxæmias of pregnancy, such as eclampsia and pre-eclampsia, is a fact that has hitherto escaped adequate recognition.

The author of this book has brought forward convincing evidence of the passage of the malaria parasite to the fœtus, thus placing the conception of congenital malaria on a secure basis. He regards quinine as indispensable in the treatment of gravid women, and quino-plasmoquine and atebrin as adjuncts that may be necessary. Far from being an oxytocic drug, quinine in effective therapeutic doses definitely prevents the premature interruption of pregnancy and intra-uterine death of the fœtus. Preliminary blood transfusion often averts the dangerous collapse that may follow delivery in women suffering from malaria. Abortion, miscarriage, premature and stillbirths are common among women suffering from hookworm disease and some 90 per cent. of the patients exhibit albuminuria and anasarca in the second half of pregnancy.

Pediatric Urology

By MEREDITH F. CAMPBELL, M.S., M.D., F.A.C.S., Professor of Urology, New York University College of Medicine; and JOHN D. LYTTLE, A.B., M.D., Assistant Professor of Diseases of Children, College of Physicians and Surgeons, Columbia University. London: Macmillan and Co. 1937. Pp. 576 and 540. Two volumes. 63s.

THIS book, we learn, is the product of ten years' work. It consists of two volumes of which the first is divided into four sections, one dealing with methods of examination and diagnosis, the second with obstructive uropathy, and the third with anatomy, physiology, embryology, and anomalies of the urogenital tract, and the last with urinary infections. The second volume consists of eight sections, the first being devoted to Bright's disease. This term is used to cover acute and chronic glomerulonephritis "hæmorrhagic Bright's disease," nephrosis, chronic pyelonephritis, and renal rickets. Bright originally described a kidney lesion in a sailor; renal rickets, or nephrosis, had no place in his original description, and it is questionable whether they should have a place in the section under this title. Some would say that in a book that will probably be read more by surgeons than by physicians, the sixty odd pages devoted to Bright's disease are in any case redundant, but since pædiatrics is a common field there is much to be said for its inclusion. The succeeding chapters are devoted to genital diseases, urogenital injuries, calculus, tumours, neuromuscular disease, enuresis, uro-surgery, and a bibliography of M. F. Campbell's publications. This work, which is a cross-cut of medicine and surgery, is very readable and the extensive quotations from clinical records kept by the authors add to its practical interest. Great stress has been laid upon congenital anomalies of the urogenital tract, which appear to be less prevalent in this country than in America. Doubtless, however, if all children attending British hospitals with any urinary symptoms whatsoever—i.e., enuresis—were subjected to a complete urinary investigation, including cystography and pyelography, the number of congenital anomalies recorded would be higher; those giving no recognisable symptoms now remain undetected. This book is profusely illustrated with excellent photographs, drawings, and reproductions of radiograms, and its index is well compiled. All interested in the dysfunction of the urogenital tract in children should have it at hand.

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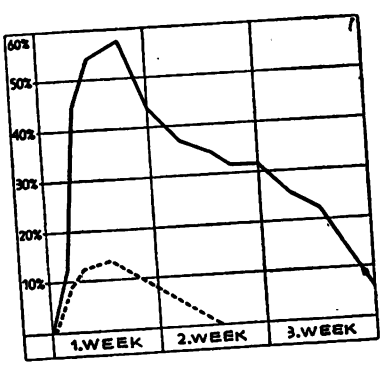

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THE LANCET

LONDON: SATURDAY, JANUARY 1, 1938

ANTISERA IN RELATION TO CANCER

THE brilliant results achieved in the treatment of a few bacterial diseases by antisera have led to many attempts to apply the same principles towards the cure of malignant growths. The assumption underlying such attempts is that the conditions are analogous and that it might be possible to develop a tumour immunity corresponding to active and passive bacterial immunity. Analogies may be helpful or they may be dangerous; and it is pertinent to inquire into the basis of this one.

The foundation of our knowledge of bacterial immunity was the observation that when living creatures contract bacterial diseases they often recover from them and are thereafter resistant to subsequent infection from the same cause. They develop, as we say, active immunity. By adapting Nature's ways this resistant state may be transferred passively from one animal to another through the medium of antisera. Resistance of this kind has not been observed in malignant growths. That spontaneous recovery from cancer does occur is well attested in the records collected by ROHDENBURG [1]; the phenomenon is, however, so rare that it can hardly be likened to recovery from bacterial infections. Further, the fact that multiple primary tumours are not uncommon shows that one tumour does not give protection against another. There is one sense in which the phenomenon of resistance has been observed. If a transplanted mouse or rat tumour retrogresses, if a tumour graft fails to take, or if embryo or other homologous normal tissue is first injected, further attempts at tumour grafting in that animal will fail. But, as will be explained below, from our knowledge of human cancer there is little evidence in favour of such a condition as tumour immunity in the bacterial sense, and the very use of such a term is misleading. The inadequacy of the methods of treating cancer in current use is, in the minds of many, sufficient justification for exploring every likely and unlikely approach to better ones. As far as serum therapy is concerned, we have watched with interest over many years the attempts made by Dr. THOMAS LUMSDEN, working for the British Empire Cancer Campaign, to prove that it is possible to obtain an antiserum specifically lethal to cancer cells. Dr. LUMSDEN's method of attacking the problem consists in taking rats which are resistant to grafts of Jensen's rat sarcoma—the resistance may be natural or may be a consequence of the retrogression of a tumour—and injecting into them, usually intraperitoneally, emulsions of Jensen's rat sarcoma. After five or six of such immunising injections the sera of the rats are shown to possess the property of killing Jensen rat sarcoma cells. The acquisition of this power appeared at first sight to be a distinctly hopeful phenomenon, but the hope abates when it is found [2 3] that the same serum kills normal spleen cells. With the further demonstration [3] that rats which are injected with *normal* rat spleen develop a substance in the blood-serum lethal both to spleen cells and to the malignant cells of the Jensen rat sarcoma, the evidence is complete that the antisera which have been called "anti-cancer sera" are not specific for cancer cells.

The subject of serum therapy in cancer is discussed in the thirty-fifth annual report of the Imperial Cancer Research Fund which we noticed briefly last week. One of the fundamental points brought out is that grafted tumours in mammals must be regarded as grafts and not as new tumours. The Jensen rat sarcoma cells growing in rats to-day are, according to all the evidence at present available, lineal descendants of the cells of a sarcoma which arose spontaneously in a rat in Copenhagen 30 years ago. Their genetic constitution is the same as, or possibly slightly different from, the constitution of the cells of the rat in which the tumour arose. They are genetically different, doubtless in varying degrees, from the normal rats into which they are now grafted in the process of transplantation. They are in fact foreign cells and the immunological responses are to their "foreignness." When bacteria are injected into test animals it is the bacterial protein foreign to the animals that evokes the antibody response. The morphology of the bacterium is not responsible for the reaction. If the protein is the same, wholly or in part, in organisms differing widely in morphology and nature, a common antibody will be evoked, as is the case with the rickettsia of typhus and *B. proteus* X19. The same is true of injected cells; serum antibodies which the cells provoke appear in response to the "foreignness" of the contained protein, and there is no other kind of discrimination on the part of the animal receiving the injection. All is overshadowed by the extremely sensitive protein response; malignancy or non-malignancy does not enter into the question. In view of this fundamental obstacle to the production of a discriminating antiserum it seems likely that further research along these lines will be abandoned as unprofitable.

ÆTIOLOGY OF RENAL CALCULI

THE urine normally contains certain relatively insoluble substances—of which uric acid, calcium oxalate, and the earthy phosphates are the most important—in far greater concentration than can be accounted for by simple solution. This apparent supersaturation is maintained either because these salts are present in the urine as more complex compounds of greater solubility, or because of the adsorptive action of colloids. Whichever explanation

[1] Rohdenburg, G. L., *J. Cancer Research*, 1918, 3, 193.

[2] Lumsden, T., *Amer. J. Cancer*, 1937, 31, 430.
[3] Phelps, H. J., *Ibid*, p. 441.

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is correct, a very small alteration in the physico-chemical state of the urine suffices to cause deposition of its solids.

Deposition is favoured by any factor that increases concentration, such as diminished secretion in hot weather or in general infections, and excessive ingestion of calcium salts or their excessive excretion (e.g., in hyperparathyroidism). Changes in the hydrogen-ion concentration may also cause deposition, as may alterations in surface tension such as take place around a foreign body or an ulcerated patch of epithelium. Many people, however, pass crystals in their urine, and only a few have calculi. If calculi are to form, crystals must not only be deposited but also retained. Any cause of stasis will encourage retention, whether an actual obstruction or mere stagnation. Stones often develop in the course of treatment of compound fractures, of tuberculous disease of bones and joints, and of injuries to the spine. They may be due to an increased excretion of calcium in these conditions, but prolonged recumbency seems to be the main factor, and frequent changes of position with adequate intake of fluids overcomes the tendency. Crystals form more readily if there is a nucleus for them to form on, and in the kidney this may be provided by a clump of bacteria or a patch of desquamating epithelium. RANDALL, EIMAN, and LEBERMAN [1] report that a deposit of calcium salts in the form of a plaque in the basement membrane of the collecting tubules and in the intertubular connective tissue is a common finding, occurring in 23 per cent. of 609 general autopsies they have performed. They show that, although these plaques are harmless as long as they remain intrapapillary, they are liable, when they occur near the surface, to lose their epithelial covering and form a nidus in which urinary salts may deposit themselves. They were able to demonstrate such a plaque in almost all of 41 examples of renal calculi. How far infection plays a primary part in stone-formation is still disputed. Bacteria are often found to form the nucleus of infected calculi, and there can be no doubt that the urea-splitting bacteria, such as *Bacillus proteus* and *Staphylococcus albus*, aid in the precipitation of phosphates. It seems to be definitely established, however, that stones can form apart from any infection, though infection may evidently hasten their growth.

For some years it has been known that gross deficiency of vitamin A will produce renal calculi in animals, and some observers believe that such stones form more easily when vitamin D is present in excess.[2] Absence of vitamin A causes hyperplasia and keratinisation of the renal and vesicular epithelium, and may produce very much the conditions that RANDALL and his colleagues have shown to precede calculus-formation in human beings. The tests for vitamin-A deficiency by means of dark-adaptation now make it possible to ascertain whether such deficiency can be demonstrated in patients with calculi, and following this line EZICKSON and FELDMAN [3] have studied the vision of 25 adults who either had calculi or were known to have had them recently. They found that 24 had "pathological" dark-adaptation, varying from mild to severe, and they treated them accordingly with a vitamin-A concentrate providing 13,000–52,000 "units" daily for six to nine months. Of this group 15 returned for re-examination, of whom 11 had carried out their treatment regularly and 4 irregularly, and it is recorded that 14 of the 15 still showed definitely pathological dark-adaptation while the other was still not normal. Other workers who have investigated night-blindness (e.g., MAITRA and HARRIS [4]) have observed an immediate and rapid response to vitamin A in most cases and if patients with calculus show no such response they appear to be in a class apart. The question arises whether their deficiency symptoms are due, not to insufficiency of the vitamin in the diet—though such a deficiency is sometimes demonstrable—but rather to an inability to absorb or utilise it. It must, on the other hand, be remembered that vitamin-A deficiency is not the sole cause of night-blindness, though the simultaneous presence of defective dark-adaptation and urolithiasis in this group of cases is highly suggestive.

LATENT SQUINT AND THE AIRMAN

HETEROPHORIA may manifest itself in three forms: (1) as a simple clinical feature of ocular discord, or allied with a refractive error; (2) as a distress which appears while engaging in some occupation; (3) as a handicap in the achievement of a purpose. In the first group fall cases for the most part very definite in producing symptoms within the normal routine of life, requiring no binocular stress for their revelation. In general ophthalmic practice the difficulty is more often the result of hyperphoria, with or without some torsion, than of weakness of convergence or of esophoric excess. The second group may be considered as the by-product of industrial progress, whether it be the machinist or the keeper of ledgers that suffers. Here effort constantly repeated over long periods has undermined the ocular muscle system to produce, as a rule, some weakness of convergence. The third group, in which successful issue to a pursuit is frustrated, arises through an inability to estimate distance with the body moving fast, whether in a motor-car at ground level or in an aircraft above the earth. To say that the presence of certain degrees of latent squint does not exercise a very definite influence under circumstances of this kind is just as erroneous as to suggest that all cases in which the condition is found are incapable of dealing with these situations. In the assessment of heterophoria with respect to its influence upon judgment of approach in flying, fixed valuations act as guides, but are not infallible. They may be regarded as standards which apply to the

[1] Randall, A., Eiman, J. E., and Leberman, P. R., *J. Amer. med. Ass.* Nov. 20th, 1937, p. 1698.
[2] Gray, J., *Chin. med. J.* 1936, **50**, 761.
[3] Ezickson, W. J., and Feldman, J. B., *J. Amer. med. Ass.* Nov. 20th, 1937, p. 1706.
[4] Maitra, M. K., and Harris, L. J., *Lancet*, 1937, **2**, 1009, 1025.

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great majority but to which, as in everything else clinical, there are exceptions. The complete explanation of any visual response is apt to lead into the limitless intricacies of psycho-physiology.

Take for example the convergence test as applied to flying personnel. There are various degrees in the response to this test.

1. Simple effortless convergence to around 6 cm.
2. Breakdown of convergence far out (12—16 cm.), but still without effort, in which one or other eye quietly loses interest and diverges.
3. Convergence forced by obvious effort to a standard distance (10 cm. or less).
4. Convergence forced, with general facial contortion and head-retraction, resulting in extreme ocular pain.
5. Complete loss of all desire to fixate from the moment the test object is moved towards the eyes.

The first case is the normal response. The second indicates a certain weakness of binocular accord in which under an exacting demand the judgment might be influenced by a predominance of one eye. This has been called by P. C. LIVINGSTON "dominant macular reception." In normal life no symptoms arise from it because, under conditions of near-vision concentration, the way of escape from binocular rivalry or confusion lies comfortably open. In aviation such cases have succeeded where the ability to judge distance is acquired through the same series of processes repeated over and over again in identical form. Difficulties are far more liable to arise where the pathway is disturbed by alternation; hence a monocular dominance gives a safer prognosis than one in which there is uncertainty as to the final pathway. The third response is the forced effort at convergence. Normally in such cases binocular life has been shared and SHERRINGTON'S final common pathway reached without discord. Some condition or set of conditions has however arrived making the act of convergence not a subconscious response but one in which some conscious force is demanded. Fatigue in its general sense is usually responsible. Such a state of affairs gives warning for a cautious ruling with regard to flying. Indeed flying strain itself may be the exciting cause of the condition, with an adverse effect upon consistent accuracy in landing aircraft. The fourth response is a later manifestation of the third. Here concentrative effort assumes authority over what was previously subconscious. There is behind these cases almost always a functional element, the structure of which rebels against a movement that has now assumed an active rôle. The normal pathway has been transferred elsewhere, the subconscious to the conscious, the natural to the artificial; and, as all things newly invoked are the more difficult of action, so much the greater is the energy demanded of a faltering will. In the fifth type of response the call to converge has lost its natural and harmonious rhythm and has become the servant of uncertain consciousness; the demand for energy in the act of convergence meets with no reply. Such a condition can arise only as part of a psychoneurosis, and the question as to flying ability is of course negatived.

A consideration of this one test—and there are others of equal importance—suggests an escape from the superficially apparent, as for example ocular muscle deficiency, to the far wider state embracing the nerve-supply to the muscles concerned, the interconnexions of those nerves within the brain, and the effector mechanism that drives the whole. If the symptomatic phorias are explored over this wide field fresh and much-needed light might be thrown on one of the potential dangers of flying.

LOCAL TREATMENT OF THE COMMON COLD

FOR better or for worse, as far as his confidence in his art is concerned, the modern doctor is aware that his clinical impressions of the efficacy of remedies are often fallacious. It is now recognised that there are few things in medical practice more difficult than to assess accurately and impartially the effect of any particular line of treatment. The pitfalls are especially numerous and deep in conditions such as the common cold, whose severity and duration vary not only in different people but in the same person in different attacks. Sometimes a coryza, beginning acutely with the initial symptoms dreaded by all of us, aborts and disappears within twenty-four hours. This is presumably because the virulence of the infecting organisms is low or, more probably, because the patient's resistance at the time is high; but the speedy cure is likely to be ascribed to any local treatment which has been used. The efficacy claimed for any "cure" is nearly always said to be contingent on its use at the earliest onset of symptoms, and few nostrums or applications profess to do much when once the attack is well established.

In recent years vasoconstrictors, containing adrenaline, ephedrine, or benzedrine, have been largely employed in the local treatment of coryza, their popularity having been greatly assisted by the well-planned advertisements of those interested in their sale. There is no reliable evidence that they can effect a cure; E. M. BOYD and W. F. CONNELL of Ontario, from experiments on students, conclude [1] that the topical application of benzedrine does not shorten the duration of a cold but that it relieves the symptoms resulting from nasal turgescence. Such relief is well worth while, provided that no harmful effects are caused. But it is not certain that such drugs may not, by inhibiting ciliary action and by admitting air more freely to the nasal passages, encourage the growth of the causative organisms. Some practitioners have an impression that infection of the sinuses is a more frequent complication of a cold when vasoconstricting agents have been employed. Again, antiseptics powerful enough to affect the organisms are likely to do damage to the delicate cells of the mucosa. On the other hand it must not be forgotten that the local application of these vasoconstricting drugs, or of mild antiseptics such as Argyrol, to the middle meatus is one of the recognised methods of treating incipient sinusitis.

The theory that the virus of coryza requires plenty of oxygen, and that Nature's attempt to

[1] *Amer. J. med. Sci.* December, 1937, p. 768.

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cure is by blocking the nasal passages and asphyxiating the organisms, has led to the use of oily substances to coat the mucosa and exclude the air from them. E. P. POULTON [2] some years ago advised for prophylactic use a viscid oil (Glegg's mixture) which consists of three parts of paraffinum liquidum with one part of white vaseline with or without gr. ½ of menthol to the ounce, to be introduced not by a spray but with a pipette while the patient lies on his back. A. ORLEY,[3] having been impressed by the improvement which sometimes follows the instillation of lipiodol in cases of bronchiectasis and chronic bronchitis, has recently advised spraying the nares with oil in which a mild non-irritant antiseptic may advantageously be incorporated. J. R. ROBSON [4] agrees with POULTON that massive doses are essential and that spraying is useless and recommends Glegg's mixture with menthol.

The application of a bland oil has the advantage that it relieves discomfort and at any rate does no harm. Relief can also be obtained by syringing with a warm isotonic saline lotion at the risk of spreading infection, especially to the ears. If this method is used it must be with the least possible force; the patient must breathe through the open mouth and must cease syringing at once if there is any tendency to swallow or retch. As in otitis after bathing, it is by blowing the nose when it is full of fluid that the danger is greatest of forcing infected matter into the ears; the patient should be told not to blow the nose for a quarter of an hour after syringing, or at least to close only one nostril at a time while blowing gently down the other. Syringing gives most relief in the later "thick" stages of a cold, when it helps to remove the stiff mucous secretion. In young children the saline lotion may be dropped into the nostrils from a pipette. The common cold, with all its sequelæ in the way of infections of the nasal sinuses, ears, and lungs, is a formidable disease. For its prevention the most hopeful method is perhaps to attempt to diminish the sources of infection by dissuading the leisured public from spreading it unnecessarily and by educating employers to encourage workers to stay at home in the early infectious stage. The only method of aborting established colds, and even sinus infections, that seems to be gaining ground is physical rest and the administration of concentrated preparations of vitamins in full doses. Certainly no local treatment has as yet been found which contradicts the old statement that a cold runs its natural course in a fortnight but that, if carefully treated, it can be cured in two weeks.

ANNOTATIONS

A NEW PITUITARY SYNDROME

IT has long been a matter of surprise that so potent a hormone as vasopressin has not been implicated in disease. The failure to find a place for it in pathology does not come from want of trying. Many attempts have been made to isolate this hormone from blood and urine in hypertensive states; but, although success has been claimed from time to time, independent confirmation has never been forthcoming. It seems evident that if vasopressin is excreted in hypertension the ordinary methods of detection are too crude to detect it. Gilman and Goodman [5] have overcome this difficulty by concentrating urine and their finding that antidiuretic hormone could be demonstrated in the urine of dehydrated rats, provided the pituitary was intact, has given direct support to the view that the posterior lobe of the pituitary is active in normal metabolism. Hard on the heels of this work comes the recovery, reported elsewhere in this issue, of a pressor-antidiuretic principle, evidently vasopressin, from the urine of a patient who presented a strange combination of hypertension, hyperchromic anæmia, achlorhydria, and symptomless hyperglycæmia. This is an interesting development of the work of Dr. Noble and Prof. Dodds and their colleagues on the effect of vasopressin in animals. There seems little doubt that the association is not fortuitous, but an expression of overactivity of the posterior lobe of the pituitary, and it is likely that other cases of the same kind will be discovered in due course. The two papers we publish this week provide food for thought and indications for future research. They should stimulate fresh attempts to look for vasopressin in commoner forms of hypertension, for example, and they should cause the hæmatologist to inquire how a sadly overburdened gland like the pituitary can find time to concern itself with hæmopoiesis. Lastly, the medical philosopher will note here another instance of the tendency to break down the artificial barriers which the systematic text-books have erected—for the convenience of the student, no doubt, but to the detriment of understanding—between diseases. When a patient presents symptoms of more than one disease the association may be nothing more than accident. But to neglect the alternative possibility is an admission of mental amblyopia.

[2] *Lancet*, 1932, 1, 933.
[3] *Brit. med. J.* 1937, 2, 877.
[4] *Ibid*, p. 997.
[5] Gilman, A., and Goodman, L., *J. Physiol.* 1937, 90, 113.

THE DANGERS OF THOROTRAST

IN some quarters there is a growing disposition to restrict the use of Thorotrast to urgent cases in which no other diagnostic measure has provided a substantial clue, but elsewhere this substance is still being injected into patients far too recklessly. The fact that it is radioactive and is retained in the reticulo-endothelial system for an indefinite time should give pause to the more enthusiastic of its users. Taft,[1] using the Geiger counter which is sensitive to minute quantities of radiation, has shown that one clinical dose of thorotrast (75 c.cm.) gives the gamma-ray equivalent of 1·37 microgrammes of radium. When it is recalled that 2 microgrammes of radium have produced symptoms of radium-poisoning it will be seen that the danger from injecting such large volumes of thorotrast is serious. The doses used, if it must be used, should be the smallest that will give the desired radiographic effect.

Apart from risks contingent on the radioactive properties of thorotrast it has now been shown by

[1] Taft, R. B., *J. Amer. med. Ass.* 1937, 108, 1779.

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Lanari, Jorg, and Aguirre [2] that this substance causes a slowly progressive fibrosis of the liver accompanied by fibrosis and the formation of Gandy-Gamna nodules in the spleen; from which they conclude that it should not be used as a diagnostic agent. In neurosurgery thorotrast is most often employed to outline the vessels of the brain by intracarotid injection. Doubtless, if the amounts injected are small, this procedure is seldom detrimental to the patient. It has however been shown by Northfield and Russell [3] that the thorotrast may sometimes occlude small veins and capillaries in the neighbourhood of compressing tumours or abscesses; such occlusion may not only aggravate symptoms but hinder recovery when the tumour has been removed. Thorotrast has been used, too, in ventriculography, the injection being made into the ventricular system, and the histological effects of this procedure have lately been investigated by Freeman [4] in material from two biopsies and eight necropsies. The longest interval after injection was two months. He finds microscopic evidence of inflammation of the choroid plexuses and of the ependyma. In the meninges leucocytes and macrophages emerge early in response to the presence of this foreign substance. Later the leucocytes tend to disappear while the macrophages become more numerous. Yet the thorotrast appears to remain in the meshes of the pia-arachnoid without exciting much chronic inflammatory reaction. At the end of two months Freeman notes a perceptible thickening of the meninges about the base of the brain with a large proportion of the thorotrast still lying free in the spaces. His suggestion that this causes no blockage of the cerebro-spinal pathway will hardly pass without challenge, and it is startling to find that his observations do not deter him from continuing to use thorotrast in this way. Others will feel that injection of thorotrast into the ventricles must now be considered so dangerous as to be unjustifiable.

PRECORDIAL LEADS IN ELECTRO-CARDIOGRAPHY

IT is already clear that in myocardial infarction electrocardiograms taken with chest leads are of value in supplementing the information given by the limb leads. There is also some evidence to suggest that they will be helpful in other cardiac conditions, and it seems probable that in the future no electrocardiogram will be considered complete unless it includes at least one curve taken with a chest lead. It is even conceivable that the latter will supersede the curves obtained from the limbs. At present, however, there is divergence of opinion on the polarity and the site of the electrode applied to the chest. The most convenient method appears to be the one in which the deflections are in the same sense as those of the limb leads, and the normal T wave is upright. The left-arm electrode is placed over the heart, and that on the right arm is the indifferent electrode—the fact that this will now produce a negative instead of a positive deflection as compared with limb leads I and II does not seem an important objection. The exact site of application of the electrode to the chest wall must be specified, since a slight alteration in its position can cause considerable change in the form of the curve. De Ruyter and Bechhoff [5] go so far as to apply their electrodes over certain fixed points of the cardiac profile while the patient is under fluoroscopic observation. They take four points anteriorly, which may be roughly described as corresponding to the four corners of the heart, and four on the posterior chest wall at similar levels. To these eight points a pair of electrodes may be applied in 56 different ways, giving 56 different curves, but 28 of these are inversions of the remainder. A special frame is used carrying movable electrodes and this is lowered over the patient and the eight electrodes are applied at once. It was found that usually with antero-posterior leads the curve was much the same whichever posterior point was used, so that in normals four dorso-ventral leads were sufficient. In the presence of cardiac enlargement, however, curves taken from a variety of dorsal points may have special value. Curves are shown obtained from 12 different chest leads, both normal and from cases with each variety of ventricular predominance. It is clear that such a multiplicity of chest leads is impracticable as a routine procedure. Further work will be necessary before the best site for applying the precordial electrode can be decided and also whether the site used must be defined so precisely as to require fluoroscopy.

THE MENTAL EFFECTS OF ALTITUDE

ALTHOUGH many writers have drawn attention to the mental effects of great altitudes, no careful psychological studies have been published of the mental states of climbers in the high Himalayas. It would clearly be impossible adequately to disguise the identity of the patients whose symptoms were described. We know enough, however, to realise that mental changes due to oxygen-lack can seriously affect the chances of success on Everest. Irritability is common. Occasions have been described on which a tired man has confused the identities of other members of the party. A state bordering on persecution mania may develop. On one occasion a climber was carried for several days down a great mountain because his "frost-bitten" feet made walking "impossible." His feet on examination were found to be perfectly normal, but his belief in his pain was genuine. The older experiments in low-pressure chambers were often interrupted by the curious behaviour of the subjects, but their symptoms were seldom studied in detail.

Gellhorn and Kraines [1] of Chicago report experiments on the associations of normal medical students subjected to oxygen-want, increased carbon-dioxide percentage, and hyperpnœa. The mental associations were studied by the method of Kent and Rosanoff: this measures not the speed of association, which in these conditions has already been shown by Lowson and Wespi to be reduced, but the "unusualness" of association. In all the three conditions examined there was an increased "unusualness" of response to given stimulus words, or, as the authors put it, a "shift to the left" in the Kent-Rosanoff test. There was also an increase over the control group in the phenomena of "perseveration," or the repetition of the same word to several stimuli; and of "dissociation," or reaction for which neither experimenter nor subject could find any explanation. The three classes of abnormal response become more frequent as the concentration of oxygen falls. Concurrently there was an increase in dizziness and tremor and a

[2] Lanari, E. C., Jorg, M. E., and Aguirre, J. A., *Pr. méd.* Nov. 6th, 1937, p. 1562.
[3] Northfield, D. W. C., and Russell, D. S., *Lancet*, 1937, 1, 377.
[4] Freeman, W., *Arch. Neur. Psychiat. Chicago*, 1937, 38, 346.
[5] De Ruyter, F., and Bechhoff, J. E., *Scalpel*, Oct. 23rd, 1937, p. 1476.

[1] Gellhorn, E., and Kraines, S. H., *Arch. Neurol. Psychiat., Chicago*, 1937, 38, 491.

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decrease in acuity of vision and hearing, as described by earlier investigators.

The interest in this work lies chiefly in the possibility of a correlation with similar tests performed in cases of mental disease. The tendency to unusual or individual response and to perseveration is naturally greater amongst the insane, and, when very prominent, is believed by Kent and Rosanoff to be pathognomonic of schizophrenia. But until the tests have been conducted under more stringently controlled conditions and in a far larger number of mental states it is impossible to gather any sound conclusions from them.

EMBOLISM UNDER OBSERVATION

HITHERTO most of our knowledge of the effects of embolism has been gathered from the study of dead tissue, and we have little information about the reactions that take place in blood-vessels during life when they are occluded by solid material. Some important observations are now described by Villaret, Cachera, and Fauvert [1] who have succeeded in demonstrating changes in the vessels of the pia mater after embolism both solid and gaseous. Using Forbes and Wolff's technique they were able to view these vessels in the living state in dogs through trephine openings in the cranium, and to obtain serial photographs of the changes following injections into the carotid artery of watery suspensions of pumice-stone containing angular particles about 150 μ in diameter. They record some remarkable reactions in the arterioles not only at points where particles became impacted, but also elsewhere. First there was a local vasoconstriction at the site of impaction, producing a fairly uniform area of ischæmia in the tissues supplied by the affected vessel, but later a series of peculiar narrow spasmodic constrictions took place in the arterioles both above and below the site, and often at considerable distance from it. The investigators show a number of photographs illustrating these constrictions. They appear as sharp indentations in the arteriolar walls, sometimes sufficient almost to occlude the lumen; they occur characteristically about bifurcations, often affecting the larger of the two branches, as if they were designed to divert the stream into the other branch; and they develop fairly rapidly, attaining their maximum in a minute or two, and often disappearing to recur again, the whole phenomenon sometimes lasting for half an hour or more.

The findings with gas emboli, on the other hand, were entirely different. Even bubbles of air large enough to fill the lumen of the arteriole and to arrest the circulation seemed to give rise to no reaction whatsoever. There was no constriction of the vessel, but rather a tendency to flaccid dilatation. The arrest of the circulation was as a rule only temporary, the air bubbles being gradually forced through to be dispersed in the capillary circulation and never to reappear again in the veins. Raising of the blood pressure by adrenaline accelerated this dispersion, but yielded no evidence of vasoconstriction such as was seen with solid emboli. Villaret and his colleagues are content to record these findings without venturing on deductions, but they hold that the phenomenon of arteriolar spasm, which has long been postulated in neurology, has now been verified and actually demonstrated, as a reaction produced by direct local stimulation. What part this plays in the development of tissue degeneration cannot yet be decided, but their findings with regard to gas embolism incidentally serve to disprove the hypothesis that vascular spasm explains the nervous disorders often been ascribed to this accident. Apparently blood-vessels are indifferent to the presence of gas in their lumen.

[1] Villaret, M., Cachera, R., and Fauvert, R., *Pr. méd.* 1937, 45, 1555.

PERITONEOSCOPY

WHEREAS the use of an optical instrument to allow pleural adhesions to be divided under direct vision is a recognised procedure, peritoneoscopy has so far met with no sort of general acceptance. The difference is, of course, that an exploratory operation is far more formidable in the thorax than in the abdomen. Ruddock [1] has used the method in 500 cases referred to him from a large general hospital and from private physicians. He considers that though peritoneoscopy should not replace the diagnostic laparotomy, in many cases it is the procedure of choice. The main point he produces in its favour is that it requires such a small incision that patients need not be kept in bed or have a restricted diet. In acute disease peritoneoscopy is contra-indicated, but in many chronic conditions Ruddock has been able to obtain all the information necessary through the very restricted opening. It is possible, for example, to decide definitely the presence of secondary deposits of carcinoma in the liver when operation is contemplated for carcinoma of the stomach. Where the cause of free fluid in the peritoneal cavity is in doubt, the appearance of the peritoneal surface may settle the diagnosis. The method also enables biopsy specimens of tumour masses and tissues to be safely and painlessly removed. The patient is thus saved the risk of laparotomy, which Ruddock puts as high as 6 per cent.

The examination is conducted under local anæsthesia with Novocain, ¼ grain of morphia being the only premedication. A pneumoperitoneum needle is first inserted and the cavity blown up with air; where the peritoneum is already under tension from ascitic fluid this preliminary inflation is not necessary. A sheath with a bistoury-pointed obturator is next inserted, the puncture being carried out steadily and cautiously with the instrument pointing to either side of the spinal column. The actual site of puncture is a matter of convenience and is determined by the area to be examined. After effecting an entrance the obturator is removed and a telescope inserted, very much like that of a cystoscope. Any fluid present is evacuated and replaced by air—the only sensation this produces is one of fullness. By elevating different parts of the abdomen and pelvis the air is shifted and the intestines moved out of the way, allowing space for manipulating the peritoneoscope and light for examining the surfaces of the organs. Inflation of the stomach with air makes it appear luminous. The Trendelenburg position brings the pelvic organs into view. The liver surface seems to have been very successfully examined. The biopsy forceps, after removal of a piece of liver or other solid tissue, are made to act as an electrode and the raw area sealed by cautery. The only death recorded in the 500 cases was due to fatal hæmorrhage from a metastatic nodule in the liver. At the end of the examination the air is allowed to escape and the instrument is removed. A skin clip or stitch closes the perforation. There were no herniæ through the site of puncture. Perforation of the intestine occurred in 8 patients, in all of whom the bowel was firmly

[1] Ruddock, J. C., *Surg. Gynec. Obstet.* November, 1937, p. 623.

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plastered against the parietal wall; Ruddock believes that it is only in these cases that it can be punctured. No serious consequences follow, since the general peritoneal cavity is not infected.

THE ANÆMIA OF IRON DEFICIENCY

C. W. Heath and A. J. Patek [1] have recently brought forward interesting additional evidence on the ætiology of so-called idiopathic hypochromic anæmia, based upon the personal study of over 300 cases of various types of anæmia responding to iron. Their conclusion is that idiopathic hypochromic anæmia is due to iron deficiency and can be relieved by adequate iron therapy. The cause of the iron deficiency is almost invariably chronic blood loss, commonly from bleeding hæmorrhoids, slightly excessive menstrual loss or epistaxis. In a series of 60 cases of apparently typical idiopathic hypochromic anæmia only 7 failed to show some pathological loss of blood, and in these for various reasons it was impossible to make complete and controlled studies. Further, patients whose blood loss could be checked did not need maintenance treatment with iron; while in those who continued to bleed the administration of iron had to be continued indefinitely to maintain a satisfactory blood picture. Diets poor in iron, intestinal malabsorption associated with achlorhydria and multiple frequent pregnancies play a secondary but important rôle in preventing repair of the blood. The ætiology of the achlorhydria which Heath and Patek found in 45 of their series of 60 cases remains unexplained and is idiopathic in the sense that it often appears to be constitutional or inherited in many cases. Diets poor in iron were present in only 37 per cent. of the 60 cases studied. Heath and Patek, in confirming the impression of many workers that blood loss in some form is the essential factor in the ætiology of idiopathic hypochromic anæmia, have apparently destroyed any justification for the term "idiopathic." They do not, however, suggest that it should be discarded or that such cases should be grouped with the more obvious post hæmorrhagic anæmias. The clinical picture they represent is a distinct entity, typically a long-standing anæmia, usually in middle-aged women, associated with achlorhydria or hypochlorhydria, atrophic glossitis and koilonychia; the blood loss is usually not at first apparent. To what extent a universal diet really adequate in iron content would prevent the occurrence of this type of anæmia in women must be a matter of speculation. But it seems clear that for the moment anyhow "idiopathic" hypochromic anæmia can be regarded as a conditioned deficiency—the conditioning factor being blood loss.

EUPHYLLIN IN CARDIAC DISEASE

Theophylline ethylenediamine (more familiar under the names of Euphyllin, Aminophylline, and Metaphyllin) has been reported to dilate the coronary vessels experimentally,[2] and has been used in the treatment of angina. It is also being administered as a diuretic and cardiac tonic in heart disease with every variety of failure, and in combating Cheyne-Stokes respiration. For the relief of any kind of cardiac pain the value of this drug (like that of the other purine derivatives) is questionable, even if it is admitted to have a powerful coronary dilator effect in animals, and there is not complete agreement on this.[3] Conclusions about the merits of such a remedy must be drawn from clinical studies, and a number of workers [4 5] have found euphyllin of no use in the routine treatment of angina. Brown and Riseman [6] record an increase in exercise tolerance after administration of euphyllin and other theophylline preparations in 17 patients with angina, but gastric symptoms (nausea and heartburn) often arose while the drugs were being taken, and when severe they discounted any favourable action on the cardiac pain. An increase in exercise tolerance of 50 per cent. or more was demonstrated in only 4 or 5 patients. de Balsac [7] reports the results of giving euphyllin in 30 cases with cardiac symptoms of various kinds, but as he admits, the results are inconclusive. With daily doses exceeding half a gramme a liability to headache, insomnia or excitement, and gastric discomfort was noted. It is clear that euphyllin has certain effects on the brain, and its ability to abolish Cheyne-Stokes respiration has been known for some years. According to Marais and McMichael [8] this action comes from stimulation of the medullary respiratory centres, and is chiefly due to the ethylenediamine component. In patients with early cardiac failure Starr and co-workers [9] found euphyllin capable of increasing cardiac output as estimated by the ethyl iodide method, and on its value as a diuretic in cases of failure with œdema there is fairly general agreement, some holding that it is more effective than any other purine derivative. It may be concluded that it is a powerful drug which may relieve symptoms of congestive heart failure, but that its efficacy against any type of cardiac pain remains unproved.

AN INERT EXCRETION PRODUCT OF PROGESTERONE

PROGESTERONE is an irritating hormone. It has been isolated from luteal tissue, its structure has been determined, it has been synthesised from stigmasterol, and it has been shown to play an essential part in the menstrual cycle and in pregnancy. But it has hitherto obstinately resisted repeated attempts to recover it from urine and blood. In this respect progesterone contrasts sharply with the gonadotropic and œstrogenic hormones, which during pregnancy are discarded so lavishly in the urine that this despised fluid is now a valuable commodity, coveted as much by the western manufacturing chemist as it always has been by the oriental peasant. Thus it is possible, even with the present rough methods of biological assay, to detect significant changes in the output of prolan and œstrin in certain diseases. But without parallel information about the secretion of progesterone, which is at once complementary and antagonistic to œstrone, it is impossible to interpret these changes. To take an instance, there is evidence that the output of œstrin tends to be low in eclamptic toxæmia as compared with normal pregnancy. This may be a primary defect. It may equally well be a compensatory adjustment to a primary alteration in progesterone secretion. In the one case œstrin is indicated as a therapeutic measure; in the other it is contra-indicated. The clinician, in fact, has no means of judging whether

[1] Heath, C. W., and Patek, A. J., *Medicine*, 1937, 16, 267.
[2] Fowler, W. M., Hurevitz, H. M., and Smith, F. M., *Arch. intern. Med.* 1935, 56, 1242.
[3] Wiggers, C. J., and Green, H. D., *Amer. Heart J.* 1936, 11, 527.
[4] Evans, W., and Hoyle, C., *Quart. J. Med.* 1933, 2, 311.
[5] Gold, H., Kwit, N. T., and Otto, H., *J. Amer. med. Ass.* 1937, 108, 2173.
[6] Brown, M. G., and Riseman, J. E. F., *Ibid*, 1937, 109, 256.
[7] de Balsac, R. H., *Paris méd.* Nov. 27th, 1937, p. 423.
[8] Marais, O. A. S., and McMichael, J., *Lancet*, 1937, 2, 437.
[9] Starr, I., et al., *J. clin. Invest.* September, 1937, p. 799.

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œstrin therapy is likely to be helpful, harmful, or merely futile, unless he is prepared to submit his patient to the risk of empirical trial. For such reasons much interest attaches to the recent work of E. H. Venning and J. L. S. Browne [1] on a substance, pregnanediol, which appears to be an excretion product of progesterone. Pregnanediol is biologically inert, but resembles progesterone in structure. It appears in the urine in considerable amounts during pregnancy and to a less extent during the luteal phase of the menstrual cycle. It is also excreted after intramuscular injection of progesterone. It can be recovered quantitatively by extraction with butyl alcohol and measured gravimetrically as sodium pregnanediol glucuronidate. It seems fairly certain, then, that progesterone is normally converted into this substance for excretion, and estimation of the output of pregnanediol should therefore throw light on the secretion of the luteal hormone. Application of this work to the study of disease is not likely to be delayed for lack of material. Progesterone deficiency has been suspected as a cause of one type of habitual abortion. It has also been suggested by J. M. Rolson and S. J. Paterson [2] and, independently, by J. Young [3] as a possible factor in eclampsia. Irregularities of menstruation provide a further group of complaints in which information about the activity of the corpus luteum is clearly desirable. The work of Venning and Browne promises to throw light on these and other gynæcological problems of practical importance.

PENTOTHAL SODIUM

THE production of barbituric compounds appears to know no bounds and as each new drug arrives it is heralded as an improvement on the last. This claim, naturally enough, is not always borne out by further experience, and already some of the earlier compounds are dropping out of use. At present the running, so to speak, is being made by Pentothal sodium which is declared to be an improvement even on Evipan. The newer body, it is said, produces no excitement—an unusual merit in a barbiturate—induces unconsciousness more quickly, and less often causes jactitation. Good accounts are given of its use in childbirth, and in Toronto Wesley Bourne and others [4] have given it to 238 women. Observations made by Bourne show that the duration of labour is shortened by its use, but that its amnesic effect is slight. Especial care must be taken during the intravenous injection not to let any of the liquid escape into the surrounding tissues, for there its power for harm seems to be considerable. Brown and Troup [5] in Australia are also well pleased with pentothal and record an anæsthesia of 25 minutes without adjuvant. The drug is generally used either for short operations or as an introduction to the anæsthetics with a longer action. It is employed as a 5 per cent. solution. The Toronto workers when using it for labour confine it to the early stages, going over to nitrous oxide and cyclopropane later. They are also enthusiastic about the value of Vinyl ether for combating the pains of the later stages of labour, after pentothal has been used earlier, and think that this agent (vinyl ether) particularly helpful in general practice. Pentothal sodium is being widely tried in this country too, and we recently published the experience of Mallinson [6] who gave a general account of the technique required, including Jarman's method [7] for continuous use of the drug in long operations. It is still questionable whether any barbiturate employed in this way is to be preferred to the other drugs more usually applied in major surgery.

[1] *Endocrinology*, 1937, 21, 711.
[2] *Brit. med. J.* 1937, 1, 311.
[3] *Ibid*, p. 953.
[4] MacPhail, F. L., Gray, H. R. D., and Bourne, W., *Canad. med. Ass. J.* November, 1937, p. 471.
[5] Brown, G., and Troup, G., see *Med. J. Aust.* Oct. 16th, 1937, p. 687.
[6] Mallinson, F. B., *Lancet*, 1937, 2, 1070.
[7] Jarman, R., and Abel, A. L., *Ibid*, 1936, 1, 422 and 600.
[8] See *Lancet*, 1936, 2, 328.

WHO PAYS THE DOCTOR CALLED TO AN ACCIDENT?

A Good Samaritan wrote to the *Times* last week in protest against his liability to pay for the professional services he procures in an emergency. He had seen a man borne into a chemist's shop bleeding and unconscious after a fall in the street. He had himself summoned the nearest doctor. Afterwards he learnt that, by the fact of having discharged this humane duty, he might have been deemed to have employed the doctor and thus might have made himself responsible for a fee. A police inspector, with whom the Good Samaritan discussed this surprising position, confirmed the obligation: the person who calls in the doctor, like the person who calls up the fire brigade, may be expected to pay the bill. Perhaps, as the Good Samaritan says, this is quite wrong. But before sympathising too warmly with his plaint we would wish to know how often in practice the caller is dunned for a medical fee; also whether in an emergency the impulse to find a doctor, whether it arises from self-importance or from genuine concern, would really be checked by the fear of having to pay him. We hear, too often, the other side of the story; of the country doctor, just settling to a meal after surgery, summoned to the cross-roads 3½ miles away to an accident of which no trace can be found by the time he reaches the spot; of a protest at the demand for a fee of £1 1s. for a night visit involving first aid and conveyance of a bleeding patient to hospital. It is without any regard for the doctor's point of view that the Good Samaritan continues: "Surely it should be regarded as a legal (as it is already a moral) duty for the nearest doctor to attend in the first instance upon any emergency call and afterwards to hand over the patient to his own medical attendant."

The idea underlying this letter may be that the services of a surgeon should always, like those of the police or the scouts of the A.A. or R.A.C., be available in emergency. The mechanism of such a scheme is left to the imagination. The provision of a rota of hospital doctors awaiting calls to outside accidents is a method that seems to work well in Russia,[8] and will perhaps prove to be the solution of the problem in other countries. It would certainly ensure that the patient, having been "rushed" to hospital, would not have to wait for skilled attention when he arrives there. At present the nearest practitioner is expected to neglect his duties to his regular patients at a moment's notice, and to let no thought of any sordid element of money or of fatigue prevent him from obeying a summons which may be quite unjustified or even frivolous. The Good Samaritan in the parable deposited his twopence and undertook to repay whatsoever more might be expended on the patient. His modern counterpart makes no mention of any payment by anybody. A suggestion has reached us that the cost of any scheme could be met by levying entertainment tax on the crowds which habitually gather round any street accident. Seats

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(suitably roofed over for promising wet days) might be let at good prices near any dangerous corner, where already the neighbouring residents are prone to assemble hopefully.

HEALTH OF THE SCHOOL-CHILD

IT is a sign of the times that nutrition occupies the most prominent place in the annual report for 1936 of the chief medical officer of the Board of Education.[1] Though it has long been realised that a child's body must be adequately nourished before it can derive full advantage from mental and physical education, the supplementary nourishment provided at some schools has not in the past been adapted to the needs of the individual. The Board of Education, taking account of modern discoveries in physiology, have now emphasised, in Circular 1443, their anxiety that the free meals supplied should not be "of the soup kitchen type" but appropriate to the deficiency; also that it is the duty of local authorities not to rely on applications from parents for the discovery of undernourished children but to invite reports from members of the school medical service or the public health service, from teachers, school nurses, and attendance officers, and from others in regular contact with the children from day to day. It is specifically stated that "any educational evidence, any inability to profit from mental and physical instruction, any lassitude, however slight these may be, may justify provision" of extra food.

The rest of the report describes progress in physical training with special consideration of the duties of organisers; medical inspections at schools and at junior instruction centres; various forms of treatment arranged through the agency of the school medical service; nursery schools and administrative measures for the welfare of the young child; the development of the school dental service, with special reference to the influence of diet on caries in children's teeth; the teaching of hygiene in schools; the education and training of the blind; and the provision of holiday camps. The work done by local education authorities and voluntary agencies in this last respect has led to such good results that the provision of camps on a much more extensive scale would be welcomed.

BISMUTH POISONING

TWENTY-FIVE years ago, when bismuth subnitrate was used in gastro-intestinal radiography and as an application to wounds, poisoning was not infrequent; but nowadays, despite the wide employment of bismuth in antisyphilitic treatment, serious toxic symptoms are rare. The more soluble salts of bismuth resemble those of mercury and the other heavy metals in causing stomatitis, gastro-enteritis, and nephritis, the stomatitis due to bismuth showing characteristic blue-black areas on the gums. Bismuth salts tend particularly to affect the kidneys and to produce a rapidly developing oliguria, but permanent renal damage is uncommon. Dowds [2] has reported three cases in which death followed 2–4 weeks after intramuscular injection of about 25 grains of sodium bismuth tartrate, the symptoms being oliguria and stomatitis; post-mortem examination showed congestion of the renal cortices and fatty liver. Even where there is almost complete anuria, however, recovery is the rule. Thus Keith and Osterberg [3] describe two cases in which a solution of bismuth and potassium tartrate was introduced into the urinary tract for radiographic purposes. One patient had a chronic pyelonephritis and an enlarged prostate and the other a ureteral stone. Both developed oliguria and vomiting within 24 hours of the introduction of the solution and an ulcerative stomatitis 3–4 days later. The blood-urea of both rose rapidly and remained high for about three weeks, but they then recovered and they were in excellent health three years later. In these cases it is possible that the effects were partly due to more highly toxic bismuth compounds present in the solution. That especial care with dosage must be taken with sickly patients is demonstrated by Eitzen's [4] case of a frail boy of 8 years who was given an injection of "thiobismol" by an osteopath as a highly original treatment for sore-throat. He passed no urine for the next six days and very little for the following week, but recovered completely within two months. Here, apart from being unnecessary, the dose given was too large. Of other symptoms, methæmoglobinuria has often been recorded in poisoning by bismuth subnitrate, and Lueth [5] has described a case in which prolonged use of this drug caused blue-grey pigmentation of the skin. Death from "colloidoclastic shock" has occasionally followed an injection within a few minutes, possibly from the drug being passed into a vein by mistake.

It is doubtful whether sodium thiosulphate has any effect as an antidote, and where there is interference with renal function the most satisfactory measure has been intravenous saline and glucose. The oily suspensions of bismuth appear to be the safest preparations, and the intravenous route is definitely to be avoided.

MEDICAL OXFORD AND THE DOMINIONS

Lord Nuffield has offered to the University of Oxford a further sum of £168,000 to provide more facilities for graduate students from South Africa, Australia, and New Zealand to share the advantages of the Oxford school. It is proposed to establish three demonstratorships to be held in turn in the departments of anatomy, biochemistry, pathology, pharmacology, and physiology, and three assistantships to be held in the departments of medicine, surgery, obstetrics and gynæcology, anæsthetics, orthopædic surgery, and therapeutics. Universities of Australia, New Zealand, and South Africa which grant medical degrees will in turn select holders from among their graduates who already hold research posts or who are eligible for them. It is also proposed that the university should appoint from time to time a visiting professor who would tour the Dominions to give information about the facilities for research in Great Britain and to find out the needs of the Dominions.

Lieut.-Colonel A. StG. Mallam, Royal Army Medical Corps, has been awarded the O.B.E., and Captain G. E. S. Stewart, Indian Medical Service, the M.B.E., for their services during the operations in Waziristan from Jan. 17th to Sept. 15th, 1937.

AT its meeting on Dec. 15th the council of Leeds University instituted a lectureship in medical hydrology and appointed Dr. Geoffrey Holmes of Harrogate to the post. This is, as far as we know, the first time that medical hydrology has been officially placed on the curriculum of study of any medical school in this country.

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[1] Annual Report of the Chief Medical Officer of the Board of Education for 1936. H.M. Stationery Office. Pp. 136. 2s. 2d.
[2] Dowds, J. H., *Lancet*, 1936, 2, 1039.
[3] Keith, N. M., and Osterberg, A. E., *Arch. intern. Med.* September, 1937, p. 415.
[4] Eitzen, A. C., *Amer. J. Syph.* November, 1937, p. 674.
[5] Lueth, H. C., *Arch. intern. Med.* 1936, 57, 1115.

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SPECIAL ARTICLES

SAFETY FACTOR OF DESIGNATED AND OTHER TYPES OF LIQUID MILK

By William G. Savage, B.Sc., M.D.
LATE COUNTY MEDICAL OFFICER OF HEALTH FOR SOMERSET

The medical practitioner is so often consulted by his patients about the milk-supply that it is important for him to have clear ideas as to the different kinds of designated milk—both what they aim to be and their safety as human food, particularly for the child. This short article endeavours to describe the types and their safety factors, as clearly as possible, as an aid to the busy practitioner. To keep it as short as is practicable I have set out the information somewhat dogmatically; but the evidence for every statement is readily available in numerous publications and much of it will be familiar.

DISEASES SPREAD THROUGH MILK

(*a*) *Acute notifiable infectious diseases.*—Scarlet fever, diphtheria, paratyphoid fever, and enteric fever have frequently been spread by milk; bacillary dysentery and acute food poisoning rather rarely. Measles, whooping-cough, small-pox, and chicken-pox have never been spread by milk.

(*b*) *Streptococcal sore-throat.*—Outbreaks of streptococcal sore-throat spread by milk are comparatively rare but may be widespread, as in the Brighton-Hove outbreak with over 1000 cases and more than 60 deaths. In 1905 I had to try to control such an outbreak with over 600 cases.

(*c*) *Tuberculosis of bovine origin.*—With the considerable extension of pasteurisation the number of cases is steadily diminishing but even now we can hardly put the deaths at less than 1700 per annum, with about 4000 infections.

(*d*) *Undulant fever.*—The number of fresh cases each year is considerable but there are no accurate returns. Prof. G. S. Wilson estimates that there are about 500 cases annually but some are direct infections from diseased cows and not actually milk-spread.

(*e*) *Indefinite infections such as gastro-enteritis.*—There is definite evidence that such cases occur but our information is inadequate. With the recent recognition of the fact that certain staphylococci and streptococci produce toxins which cause definite gastro-enteritis this factor cannot be ignored, but probably it is not of great importance.

For more detailed information on milk-spread disease see Savage (1937).

THE PRESENT OFFICIALLY RECOGNISED TYPES OF MILK

In the following list those marked with an asterisk are the graded milks prescribed by the Milk (Special Designations) Order, 1936.

(1) *Tuberculin-tested milk* * is produced from herds whose cows are free from tuberculosis and are maintained free from tuberculosis by a system of veterinary inspections with tuberculin-testing of each animal not less than once every six months, and a system of isolation. There is also a bacteriological standard of cleanliness and requirements as to hygienic production. If milk so produced is bottled on the farm it can be described as *Tuberculin-tested Milk (Certified)** ; otherwise the conditions are the same. It may also be pasteurised under the approved official conditions; it then has to be called *Tuberculin-tested Milk (Pasteurised)** and the bacterial standard is much higher (30,000 bacteria per millilitre).

(2) *Accredited milk.**—This is milk from ordinary cows (i.e., there is no tuberculin-testing) but the cows are subjected to a quarterly clinical veterinary examination. On the other hand, there is no restriction as to the admission of any cows at any time apart from the admission of a known tuberculin reactor. The main requirements are of much more hygienic production (the standards enforced varying very greatly in different areas) and a bacteriological standard of cleanliness which is the same as for tuberculin-tested milk.

(3) *Pasteurised milk* * is milk which has been retained at a temperature of not less than 145° and not more than 150° F. for at least thirty minutes and then immediately cooled to not less than 55° F. The plants used and the conditions of working are controlled by the local authorities who grant the licence, while certain requirements are prescribed such as the use of automatic temperature records. There is a bacteriological standard for any time before delivery to the consumer, but no standard as to the quality of the milk to be pasteurised.

(4) *Ordinary milk* is subject to no bacteriological standards or any standards as to freedom from pathogenic organisms. The only control over its production is the supervision exercised by the local authorities under the Milk and Dairies Order, 1926. The requirements of the Order itself are vague in many particulars and the enforcement (except in urban areas where there are very few cowsheds) is very unequal and in many areas nominal.

RISK OF TRANSMISSION OF DISEASE

The risk of contracting disease from milks of the different types is conveniently demonstrated in the following Table which shows how far this risk has been removed by the precautions taken.

Human disease.	Raw milk.	Tuberculin-tested.	Tuberculin-tested (pasteurised).	Accredited.	Pasteurised.
Acute infectious diseases..	+++	++	−	++	−
Sore-throat outbreaks ..	+++	+++	−	+++	−
Tuberculosis	+++	−	−	++	−
Undulant fever	+++	+++	−	+++	−

+++ = Full risk. ++ = Risk somewhat reduced.
+ = Risk greatly reduced. − = Risk removed.

In preparing this Table I have taken the view that the better general control over production which is required for tuberculin-tested and accredited milk is of some slight value in reducing the risk of infectious disease transmission; but inasmuch as a survey of the health of the milkers is no part of the conditions of production many will not accept this view and will hold that there is no protection at all. I have given these milks the benefit of the doubt.

As regards sore-throat outbreaks, which are caused by highly specific streptococcal infections of the cow's udder, not capable of detection by veterinary inspection and having nothing to do with ordinary cow mastitis, I do not think there is any evidence

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that the veterinary inspection required is likely to lead to a reduction of incidence.

The extent to which the quarterly clinical veterinary inspection required for accredited milk reduces the likelihood of tubercle bacilli being present is a matter of considerable interest. It has to be remembered that the ordinary accredited herd can and often does contain just as high a proportion of cows affected by tuberculosis (as shown by a positive reaction with tuberculin) as the ordinary herds. Whether or not tubercle bacilli are being excreted depends upon the site of the infection, and at any time such a cow may become an "open" case actively eliminating tubercle bacilli. Every veterinary surgeon of experience agrees that these animals can be detected only by the use of the tuberculin test, which is *not* used for accredited milk. In fact it is not at all uncommon for the bacteriologist to find tubercle bacilli in the milk of a herd and for the most experienced veterinary surgeon to be unable to detect the animal by clinical examination; he may only be able to do so by a long procedure of bacteriological testing of the milk of individual cows and groups of cows. Furthermore herds are continually changing and additions taking place between the quarterly examinations, and these additions may include infective animals. It is not possible therefore to rate very highly the value of this examination as regards protecting the milk from infection with the tubercle bacillus. It is possible however to give a quantitative estimation of the risk reduction. Statistics obtained by the People's League of Health showed that out of 5274 samples of Grade A milk (the old name for accredited milk) 5·59 per cent. contained tubercle bacilli. For ordinary raw market milk (not bulked milk, the percentage infection of which is 100) the proportion containing tubercle bacilli is 6–7 per cent. Taking a figure of 6·5 per cent. a reduction to 5·59 represents a percentage reduction of 14. I think it is a fair calculation to say that the quarterly clinical veterinary examination affects a reduction of risk of from 14 to at the most 20 per cent.

The Table is based upon the assumption that the pasteurisation is properly controlled and performed. Unfortunately the Milk Designations Order gives the control to the rural and urban councils and this duty is not adequately carried out everywhere. Where, as for example in Somerset, a proper system is followed and adequate laboratory controls are used pasteurisation is very efficient. The phosphatase test gives complete laboratory control when combined with suitable inspection.

OBSERVATIONS

The Table shows very clearly that only pasteurised milk is really safe from the risk of conveying disease. Given efficient pasteurisation, with the milk bottled and thus secure from the possibilities of subsequent infection, the safety factor is absolute.

The Table is a little misleading in one way, because it cannot bring out the *relative* importance of the risks run. Tuberculosis is by far the most important condition so that a definitely higher value attaches to tuberculin-tested milk than is apparent in the Table. The elimination of the risk of conveying tuberculosis through milk is such a great advance that it is reasonable to attach great importance to this type of milk even if it is not pasteurised. When I was county M.O.H. for Somerset the only milks allowed to be used for school-children without boiling were pasteurised and tuberculin-tested.

In July last the Government issued their white paper "Milk Policy" laying down lines for future legislation. One proposal is to empower local authorities, under certain conditions, to apply to the Minister of Health to make compulsory the efficient pasteurisation of milk sold by retail in its area. Exempted from this requirement will be milk from tuberculin-tested herds. In view of the importance of *safe* milk for the community it is to be hoped that the medical profession will give the strongest support to this wise, but long overdue, proposal.

The fact that the changes produced in milk by pasteurisation are negligible (the reduction of vitamin C not being of practical importance) has been so often demonstrated that it is unnecessary to reiterate it. I discussed these changes in detail in THE LANCET in 1933 and since that date there have been several important investigations confirming the full equality of pasteurised milk with unheated milk as regards its nutritive value.

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MEDICINE AND THE LAW

Romance

SUCCESS in their profession is for some an uphill journey. To Dr. Thomas Ronald Hyman Max Davies it came swiftly. Just as Adam, the first man, was spared all infantile complaints, so Dr. Davies escaped the tedious years of medical training and examination. Adopting the name and degrees of a medical practitioner who had died in Norfolk, he found his qualifications ready made. Owing to the misadventure of a conviction for blackmail at Winchester assizes last month, his professional career has been temporarily interrupted. For his biographical details we have only the bald statements of a detective inspector who, after the conviction and before the sentence, gave the court such information as was officially available. The record, supplemented by the enterprise of journalists, was full of romance. The birth certificate of the accused was in the name of George Maxim Davidson. He served as a seaman in the mercantile marine and was afterwards an engine-cleaner in an aircraft undertaking at Croydon. He married and had two children. Five years ago he left his family abruptly. His wife never saw him again till he stood in the dock at the Portsmouth police-court last September. He begins a new life as Dr. Davies, M.R.C.S., L.R.C.P., claiming, it is said, to have acted as locum tenens for a Harley-street consultant. He marries a lady whom he meets at a dance. His practice evidently prospers, for he lives expensively. He administers 14 injections for diabetes to a well-known theatrical artist who is later informed by another doctor that he is not suffering from that disease at all. He treats several women for large fees. He is said to have attended maternity cases, carrying the usual surgical instruments. The police suspect him, though they admit they have no evidence of this, of making money by criminal abortion. He obtains £553 from a rich widow in London apparently on the plea that he was fighting the General Medical Council. He is awarded £250 special damages in the High Court under the name of Dr. Davidson for injuries alleged to have been sustained in a motoring accident; the defendants seem to have missed a rare opportunity for an interesting cross-examination. The police say that, when arrested, he was planning another claim against an

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insurance company in the name of Dr. Douglas Colquhoun for serious damage due to a traffic accident. His forensic experience was his undoing. His second wife meets at Portsmouth one of the ever-increasing tribe of "Mr. X." Dr. Davies demands money under threat of divorce proceedings. There is one trivial obstacle in his path. Being still married to his first wife, he is technically unable to divorce his second. Dr. Davies, however, does his best. He has an acquaintance called Duke, an ex-railway official who has been compensated with £1800 on retirement from a redundant post and who is now a taxi-driver. Duke is asked to assume the name of Medway and is cast (though Duke himself denies this on oath) for the part of the solicitor who is concerned with the divorce proceedings. Dr. Davies, Duke, and Mr. X meet in London, but eventually the police intervene. Dr. Davies is found guilty on ten counts of fraud charged in different forms. He pleads guilty to bigamy. There are four outstanding charges, one for forgery of a motoring licence, which the court is asked to take into account. The judge, in sending him to penal servitude for four years, seems almost to apologise for his leniency. Bad as he finds the case to be, he can imagine worse; so the maximum of five years is rightly deemed inappropriate.

Unless it was one of the unspecified charges taken into consideration in passing sentence, the offence of masquerading as a doctor, it may be observed, was not before the court at the trial. The country shows no concern over this minor aspect of Dr. Davies's career. Had he been tried under Section 40 of the Medical Act, there would doubtless have been an argument as to whether he had acted "wilfully and falsely"; his patients would doubtless have gone into the box to testify their gratitude for the benefits of his treatment; and the public would doubtless have suspected that this was just another persecution of a brilliant unorthodox practitioner by the hide-bound representatives of old-fashioned medicine. Be that as it may, it is perhaps worth noting that, almost at the moment of Dr. Davies's conviction, the architects obtained the second reading of a Bill which is to prevent anybody from calling himself an architect unless he is a "registered architect" under the Act of 1931. The Bill has none of the old nonsense of "wilfully and falsely." And the House of Commons is told that the Bill is necessary in order to give architects the same degree of protection as the medical profession enjoys. It seems not to have been appreciated that the medical profession has no more protection than the architects have already obtained under the 1931 Act. Architects are to be given what is denied to doctors. The Bill, said the proposer, was necessary for the protection of the public; laymen were defrauded if, in their ignorance, they employed an unqualified man. Architects, said the seconder, are not made in a night; it takes years of training. But why all this fuss about curricula and examinations? Whether we are legislating for those who build houses or for those who merely attend to the health of the people, the romance of Dr. Davies has shown us a far, far better way.

Delusional Insanity and the Disposing Mind

Mr. Justice Langton gave judgment on Dec. 21st in the prolonged dispute over the disposal of the £180,000 estate of the late Mr. A. H. L. Bohrmann. Two solicitors (who were the executors) propounded a will and four codicils thereto. The general effect of these documents was to give the bulk of the estate to charities in the United States, subject to a few legacies to relatives. The next of kin contested the will and codicils on the ground that Mr. Bohrmann suffered from delusions and obsessions which made him incapable of making a valid will. One of the witnesses called on behalf of the next of kin was Dr. R. D. Gillespie. He said that he found in the evidence the symptoms of mental disease. He classified the testator as a paranoid psychopath—i.e., a person not certifiable as insane and often of good intelligence but so far lacking in the balance of fundamental instincts, emotions, and sentiments common to mankind as to be disabled from the discharge of important social responsibilities. It was the mildest form of a mental disease which was constitutional and hereditary. Mr. Bohrmann had shown a morbid capacity to bear animosity. Mr. Justice Langton said that the law did not recognise any half-way house between delusional insanity and sanity. The court had been asked to say that the category of persons described as paranoid psychopaths (who fell short of delusional insanity) had not testamentary capacity. It was not within the judge's power to make such an advance; he was not able to say that a paranoid psychopath was incapable of making a will. Mr. Justice Langton was, however, satisfied that a delusion as regarded the London County Council was perfectly well established. This had caused Mr. Bohrmann to make an extraordinary declaration in the last of the codicils whereby the word "England" was deleted and the words "United States of America" substituted. Although the judge thought that the will as a whole must be upheld, he decided to delete that part which had been dictated by delusional insanity. It is doubtful whether there is any precedent for this course. The courts have been ready to delete parts of a will which have not been brought to the knowledge and approval of the testator. In this case the particular passage had not been brought to the knowledge and approval of the testator as a sane and balanced man.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

THE FUTURE OF VOLUNTARY HOSPITALS

ACCORDING to Mr. D. H. M. Pyle, president of the United Hospital Fund, who estimates the population of New York City in the year 1960 at 10,800,000, adequate hospital provisions for the expected population require a further investment of $371,000,000, a sum only slightly less than the present hospital investment. Can such a sum be raised by voluntary contributions? Revenues from paying patients have fallen off, and gifts have decreased by one-third since 1930.

The occasion for this speculation about the future of New York's hospitals was a special meeting of the trustees of the United Hospital Fund to consider a report on the hospital survey which has been conducted over the last two years under the direction of Dr. Haven Emerson, former health commissioner of the city and now professor of public health practice at Columbia University. This survey has called attention to the need for reform in certain directions. In Mr. Pyle's words:

"The survey has demonstrated the shocking lack of coördination between ourselves, hospitals under other types of control, convalescent homes, homes for the chronically ill, independent dispensaries and visiting nurse groups. It has proposed an integration

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of our separate services, each with the other. It has recommended the extension of our services into the homes so that those who cannot afford private care in illness need not necessarily occupy hospital beds....

"Our system of voluntary hospitals, viewed in the aggregate and financially speaking, is virtually in liquidation.

"Many of our plants are fast wearing out, becoming obsolete; a third of our building investment, a half of our bed capacity, is in buildings over twenty years old. We have made no financial provision through depreciation reserves for the eventual replacement of old buildings but have relied on the hope, once justified by experience but now no longer a certainty, that the amounts necessary for new plants would be given us when required by a generous public. Our operating surpluses and spendable funds are depleted so that now we have little more than half the total of $80,000,000 available at the close of 1930.

"Nearly a half of our separate units have either no operating surplus or an amount so small as to not provide a safe minimum of working capital. By comparison with 1930, our revenues from paying patients are less than it seems reasonable we should expect them to be in view of our increased bed capacity. Increasingly we are dependent upon government payments for public charges. Our contribution support for current purposes has declined nearly a third since 1930. We now receive from that source nearly double the amount paid to us by the city in 1930. The hospitals have recently requested a change in the basis of payment that will increase these revenues another 50 per cent.

"And in the face of all this, it now seems clear that within the next twenty-five years, the hospital system of New York City, of which we are a part, must replace 24,300, or nearly half of its present beds and in addition provide 25,500 new beds."

The moral drawn by Mr. Pyle is that the voluntary agency must select for itself a function which it can fulfil well, within its financial limitations, and must coördinate its activities with those of governmental institutions and agencies. "Unless we put our house in order," he concludes, "circumstances perforce will require that government do it for us."

PROPOSED LEGISLATION FOR DANGEROUS DRUGS

The disaster caused by the distribution of an elixir of sulphanilamide which contained a highly toxic diethylene glycol has given a new impetus to the preparation of corrective legislation. The report from the Secretary of Agriculture on the deaths in this disaster includes the following recommendations:

1. License control of new drugs to insure that they will not be generally distributed until experimental and clinical tests have shown them to be safe for use. The definition of what constitutes a new drug should include (*a*) substances which have not been used sufficiently as drugs to become generally recognized as safe, (*b*) combinations of well known drug substances, where such combinations have not become generally recognized as safe, and (*c*) well known drug substances and drug combinations bearing label directions for higher dosage or more frequent dosage or for longer duration of use than has become generally recognized as safe. Exemption should be made for new drugs distributed to competent investigators for experimental work. A board of experts should be provided who will advise the Secretary of Agriculture on the safety of new drugs.

2. Prohibition of drugs which are dangerous to health when administered in accordance with the manufacturer's directions for use.

3. Requirement that drug labels bear appropriate directions for use and warnings against probable misuse.

4. Prohibition of secret remedies by requiring that labels disclose fully the composition of drugs. Many foreign countries now impose this requirement. Many drugs manufactured in the United States are exported to such countries under labels bearing such disclosure. The same drugs are sold to our citizens under labels that give no hint of their composition.

This, it is hoped, is one of the steps toward the introduction and passage of a suitable Food and Drug Act at the next regular session of Congress.

THE A.M.A. BROADCASTS TO THE SCHOOLS

"To the schools of America: your health" is the weekly greeting sent out over a national network of 88 broadcasting stations by the National Broadcasting Company's announcer from the company's studios in Chicago. Yesterday, through the kindness of Dr. W. W. Bauer, director of the bureau of health and public instruction of the American Medical Association, I was able to see the performance of the Association's weekly health play in the N.B.C. studio. Professional actors read the script, a professional orchestra supplies the incidental music, a specialist supplies "sound effects" as required. Yesterday the subject of the play was tuberculosis and the presentation exceedingly dramatic: the actors wore ordinary clothing but indulged in gestures and facial expression just as though they had been on the stage. At the close of the play Dr. Bauer summarised in a few minutes the practical lessons about tuberculosis which the story had brought out.

In order that teachers in junior and senior high schools may gain the maximum benefit from this ambitious programme of health education the Association has made available to them at a nominal cost a "pupil's work book and guide" containing questions for the student to answer and space for his answers; framework for tabulations of his observations and experiences and appropriate references to the literature of each subject. All this is arranged in weekly lessons each to correspond with the subject of the weekly broadcast. A series of "briefs" on these lessons is also published for the benefit of the teachers. These give suggestions for educational "projects" and further reference to books and papers.

The course of broadcast lessons begun in October will continue until the middle of June—that is for the extent of our school year. The main headings of the course, each with four sub-titles, are as follows: personal health, hygiene, diet, contagious diseases, preventing future illness, public health, health education, mothers and children, using health knowledge. The broadcasts are so timed that they may be heard in school hours whether the school is located on the east coast or on the west.

BUCHAREST

(FROM OUR OWN CORRESPONDENT)

PUBLIC HEALTH SERVICES

BEFORE the Liberal Government resigned it gave an account of its work during its four years of office. M. Costinescu, Minister of Health, when he took up his post regarded as his first duty the reorganising of the medical profession, and at the same time augmenting the State medical and auxiliary services. He raised the number of official physicians from 1700 to 2413. At every rural centre a dispensary has been established—in the last three years 549 have been

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put up, so that at present there are altogether 1249 in the country, all well supplied with drugs.

During 1936 arsenic, bismuth, and mercury preparations worth 87 million lei were distributed amongst the dispensaries, marking a very important step in the campaign against syphilis. One of the most extensive social diseases is pellagra. Health measures alone have been inadequate, and M. Costinescu held that the solution of this grave problem is in the hands of the Minister of Agriculture, who ought to bring in strong measures checking the decay of maize. Another widespread disease that claims too many victims is tuberculosis, there being about 500,000 cases in Rumania. New sanatoriums have been built and the old ones enlarged; while in 1934 there were 1500 available beds, there are now 3000. A new system has been introduced where all candidates for public appointments have to be medically examined, those who are even suspected of being infected being rejected, lest they infect their associates. Energetic action has been taken also against typhoid fever. Owing to the defensive work by 40 mobile squads instead of the several thousand cases of latter years, at present there are altogether only 56 cases in the hospitals. Against malaria, which undermines the health of more than a million of the population, a still more energetic and efficacious campaign has been launched, in addition to the distribution of quinine. By draining the swamps the evil may be exterminated in its root, but the enormous work this involves will not be finished for about 15 years. In the four years 32 fever hospitals have been built and 40 repaired and reopened, and 40 county hospitals have been fitted with modern equipment; each has now a motor ambulance.

SHORTENED POST-OPERATIVE CONVALESCENCE

Prof. Liviu Campeanu, director of the Marzescu Hospital in Brasov, began to investigate some years ago whether it was possible safely to shorten the time of convalescence of patients after operations. He came to the conclusion that convalescence in many cases is too long. He has a series of patients who got up two days after an operation for appendicitis, and even several who stepped down from the operating table and walked to their bed. His investigations embraced about 1000 surgical patients, and the shortened convalescence did not cause any harm; in fact they were glad to be able to return to work so early. Prof. Campeanu's ideas have spread all over the world, and lately he received three distinguished foreign visitors, John H. Gordon of Boston, U.S.A., Lecutiu Traian of Detroit, and Martin Tezdal of Oslo. They were surprised, on asking patients walking about dressed as healthy people when they were operated upon, to be told by one that he underwent an operation for appendicitis the day before, and by another, a woman, for umbilical hernia three days before. Prof. Campeanu has received an invitation from America to lecture there on his methods.

NAME PLATES AFTER MOVING HOUSE

Recently a Bucharest physician moved away from his old flat and he left behind his name plate with an indication of his new address. The landlord ordered the plate to be removed, and he was summoned by the doctor at the county court. The verdict obliged the landlord to replace it on the grounds that it had become a general custom for a professional man to leave his name plate behind for a certain time. This holds even if the doctor was evicted by the landlord for non-payment of rent, or if there was a difference between them in connexion with medical fees. On the other hand, the plate can do the landlord no harm at all; on the contrary, it is an advantage to him by saving his porter the trouble of telling inquirers where the doctor lives.

A NEW PÆDIATRIC JOURNAL

Under the title of *Revista de Pediatrie si Puericultura* a new journal has been created by Prof. Gheorghe Popovici, who holds the chair of pædiatrics at the University of Cluj. Prof. Popovici collaborated in valuable research on vitamins with Prof. Paul György, formerly of Heidelberg, and now at the University of Cleveland, U.S.A. The new journal appears monthly, in a very attractive cover, and is published and edited by the Society of Pediatrics and Puericulture, Cluj.

A PRIZE FOR PSYCHIATRISTS

On his retirement, Prof. Joan Nanu-Muscel deposited at the National Bank of Rumania 800,000 leis to the credit of the Medical Academy. This will enable the award of 72,000 leis every three years to the author of the best treatise on the treatment of schizophrenia. The prize will bear the donor's name.

DEATH OF PROF. A. OBREGIA

The death is announced here of Alexandru Obregia, for 40 years professor of psychiatry in the university, from septicæmia in his 77th year. As a student he was pre-eminent, winning several scholarships, and being elected president of the Association of Medical Students. He has been regarded as the parent of cisternal puncture, now so much in vogue. His accounts of his investigations into the manic-depressive psychoses and general paralysis of the insane are known world-wide, and have been translated into several western languages. His creative genius did much in modernising Rumanian public health, and he was twice leader of the national public health administration as ministerial secretary. He founded the Central Hospital for Insanity and for Nervous Disease, and the Socola Hospital in Jassy, capital of the province of Moldowa. It was a great distinction when in 1922 during the Averescu régime, he was honoured with the position of vice-president of the Senate. The *Romania Medicala*, the leading medical journal of the country, has devoted an entire issue to his memory.

Panel and Contract Practice

The Payment of Anæsthetists

IT is seldom that the Government auditor makes a "reservation" about the accounts of an insurance committee. That the Kent committee have recently been the victims of such action need cause no disquiet, because the expenditure questioned on this occasion has been sanctioned in retrospect by the Minister under the powers conferred upon him by the 1936 Act (Section 117 (2) and the Fourth Schedule). The trouble is about the inclusion among the charges to the practitioners' fund 1936 of the sum of £118 13*s.* in respect of payments to certain practitioners assisting at operations for the services of a colleague as anæsthetist, the operation being performed by a third practitioner. The auditor held that there was no lawful authority for such payments.

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According to Clause 9 (7) of the terms of service a practitioner is responsible for providing the services of an anæsthetist for any operation (other than an obstetric operation) that he is performing himself provided that the operation is of a kind usually undertaken by a practitioner, and that the administration of the anæsthetic does not involve special skill or experience. Clause 2 of the distribution scheme shows how special payment for the services of an anæsthetist may be secured (as a first charge against the practitioners' fund). When this question was considered in 1925 by the Kent panel committee, they had before them a list of cases where, in the opinion of the Insurance Acts Committee, an anæsthetic fee could be paid, and noted that these did not include cases in which the practitioner summoning the anæsthetist was himself only acting as an assistant. But the panel committee took the view that the intention of the Minister *was* to provide an anæsthetist under these circumstances and to pay for his services and that the limitations suggested by the I.A.C. followed too closely the strict legal interpretation of the regulations. The committee considered it unlikely that the Minister would raise any objection to a more liberal interpretation, as the payment would be made from the local practitioners' fund and would entail no extra cost to the central funds. Actually no official objection was raised until the accounts were audited at the end of 1936. The Minister upheld the objection then made and such payments will not be allowed in future.

The position is that a practitioner may be paid for the services of an anæsthetist only when he is required to provide those services, and this is only when he performs the operation himself. He is however bound to give either assistance or an anæsthetic as part of his obligations, without cost to the insured person. The executive committee of the panel committee have decided not to contest the decision as regards the future, but in view of the period during which claims have been met without question the Minister is to be asked to sanction payment of a number of claims made during 1937, as he has already done for those made during 1936.

PUBLIC HEALTH

Confidential Reports

AT a recent meeting of Caernarvonshire combined sanitary committee a protest was made against a refusal of the Minister of Health to supply Gwyrfai council with a copy of a report on the district by one of H.M. inspectors. The clerk observed that the question whether reports made by the Ministry of Health inspectors should or should not be submitted to the authorities concerned had long been "a bone of contention." Surely there is some misunderstanding here. These inspectors are the servants of the government departments to which they are attached and their investigations are submitted as confidential communications. It lies with the Minister concerned to decide what shall be done with them. If he sees fit, and often he does, he issues a communication to the authority concerned, but he could hardly be expected to supply on demand his official correspondence. A more common complaint by a sanitary authority is that it does not see the annual report of its medical officer before it is published and copies have been sent to the Minister of Health. Here the position is slightly different, for the medical officer of health owes allegiance to the local authority that appoints him and pays his salary. But in fact the Ministry of Health mostly pays directly or indirectly half this salary, and except in a very few places has to give consent to the appointment or dismissal of a medical officer. In return he claims the right to see the annual reports before they are presented to the local authority. In the few boroughs where the Ministry has no control of this kind, the annual report need not go to the Ministry before it is passed by the local authority. It is a grievance of local authorities that their medical officers may say something which is distasteful to them and that they have no power to prevent its publication. But this privilege lies at the very foundation of our system of public health administration. It is very seldom abused and if it is the local authority has a remedy. For though the medical officer cannot be dismissed without the consent of the Minister of Health, this consent would only be withheld if the officer is likely to be victimised for doing his duty. Every year some authorities register objections to the annual reports, but as the objections are usually to unpleasant truths, nothing comes of them. We have not till now heard of any local authority openly objecting to the refusal of permission to see the reports of the Ministry's inspectors, though we are well aware that many would like to see and edit them before they reach Whitehall.

Youthful Offenders

The Home Secretary has sent a circular letter to the clerks of justices suggesting that juvenile offenders should sometimes be placed in lodgings or in a family in place of being sent to an institution. The courts already have power to provide for the maintenance of offenders under 21 in approved hostels from which they can go out to daily work, and the Government is now prepared to assist financially a much wider use of this method. An unruly child of 14 or 15 may be better in an approved home than in an approved school, and in future a grant may be made from public funds for this purpose also.

A memorandum sent to the Home Secretary by the Parliamentary penal reform group urges him to use the proposed observation centres as clinics. This group is convinced that not only personal suffering but cost to the community would be saved by psychiatric treatment in suitable cases, and it would like the Home Secretary to make further use of the powers he possesses of trying out measures of penal reform. Happily Sir Samuel Hoare has already shown himself inclined to make such experiments.

A List of Sanatoria

A new edition has been issued by the Ministry of Health of the list of sanatoria and other residential institutions approved for the treatment of tuberculous persons in England and Wales. Most local authorities are obliged to rent such beds from the voluntary bodies during the summer months; some, such as the L.C.C., do so all the year round. The list has its value in selecting institutions for this purpose. The Ministry's approval implies a certain standard and is to that extent a check on the type of institution available. The list (10*f*) can be had from H.M. Stationery Office for 6*d*.

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GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A BACTERIOLOGICAL BACK-NUMBER

I

WHEN Jenner and Pasteur developed the idea of artificial immunisation they did something more than make a scientific discovery; they founded a faith and as so often happens with faith came an offset of superstition and charlatanry. Neither of these great innovators approached the matter as entirely unprejudiced and impersonal observers. They aspired to be missionaries as well as scientists. It seems odd in our disillusioned age that the nineteenth century should have found its sermons so readily in stones though it was perhaps the gift for identifying what *is* with what *should be* that made it both great and ridiculous. Immunisation was born and brought up in rose-coloured surroundings and it has continued to live in a dangerous atmosphere where the wish has been wont to be the father of the thought.

* * *

We have lived through some striking changes in the attitude to small-pox vaccination. Compulsory vaccination which once had the suffrage of the nation has now hardly a serious supporter. We are ashamed to jettison the idea completely and perhaps afraid that if we did the accident of some future epidemic might put us in the wrong. We prefer to let compulsory vaccination die a natural death and are relieved that the general public is not curious enough to demand an inquest. In the meantime our attention is diverted to other and newer forms of immunisation. In our own immediate times diphtheria immunisation has taken its turn as the arch stunt of the immuniser. The scientific ideas behind it were certainly engaging and were proved beyond any reasonable doubt. The Schick test distinguished the susceptible from the immune and by a simple treatment the susceptible could be made immune. These facts carried with them no categorical imperative. That diphtheria can be prevented by immunisation no more implies a command to immunise people than the fact that nitric acid and glycerin make an explosive mixture implies a command to blow up our neighbours. Yet the immunisation of the masses has been undertaken with almost a religious fervour. The enthusiast rarely stopped to wonder where it would all finish or whether the fulsome promises made to the public in the form of "propaganda" would ever be honoured. Without propaganda there can, of course, be no large-scale immunisation, but how perilous it is to mix up propaganda with scientific fact. If we baldly told the whole truth it is doubtful whether the public would submit to immunisation. On the whole diphtheria immunisation has proved a fairly safe affair, but suppose we included in our propaganda a candid account of the various untoward accidents which have accompanied the procedure. No method involving a parenteral injection is without a significant risk. When injecting a healthy individual with anything we are always skating on thin ice. Sick people for the most part are quite prepared to take a risk in trying out a remedy, but the main desire of well people is to preserve their status quo. If you knock them out in an effort to protect them from a disease there is no knowing they will ever get, there is the devil to pay. Accidents and mistakes must inevitably happen and when they take place what might have been a highly instructive lesson is usually suppressed or distorted out of recognition. Those who have had to take detailed notice of the immunisation accidents of the past few years know that to get the truth of what really went wrong generally calls for the resources of something like a secret service. And if the technical experts have often been furtive and disingenuous in their methods the public in its turn is unfair and vindictive. The whole world is ready to be wise after the event and a scapegoat has to be found at all costs. Some of the mistakes that have been made seem foolish enough when coldly reviewed: mislabelled bottles, preparations issued without check tests on animals, the omission of a disinfectant—all this seems easily avoided but the point is that they *are* made and are bound to be made sometime or other, even with the greatest vigilance. There are few immunologists responsible for the preparation of immunological reagents or doctors who have carried out immunisation on a large scale who have not had some hair-raising experience.

* * *

My own most unhappy experience in this direction was when immunising a group of mentally defective children against scarlet fever. It was in the early days of scarlet fever immunisation but we had already had a reassuring experience with many hundred children. Of course we knew that we had to deal with a population that might contain some pleasant "unknowns" and we ran a preliminary trial on two or three dozen of the children to see how things would go. Everything went well, so as time and the occasion pressed, we proceeded to immunise the rest of the children. We had not got very far when we were urgently called back to the bed of one of the injected children and there found a Mongol imbecile pulseless and looking like death. In the next few minutes came four more summonses of the same kind and each of the unfortunate patients was a Mongol imbecile. We had failed to include a specimen of Mongol in our try-out—a stupid enough thing to do, for as everyone knows Mongols are odd little folk and a law unto themselves. All's well that ends well and fortunately all the patients recovered with almost the same speed and inconsequence with which they had collapsed. Even to this day we don't know the reason for this strange behaviour of Mongols and needless to say we were deterred from further experiments on such kittlecattle. We may not have learnt anything of the essential nature of mongolism but we *did* learn to think more feelingly of the misfortunes of our fellow immunisers.

The risk of accidents must remain one of the snags of all forms of immunisation. The individual immuniser is after all the only person who has the moral right to decide whether the game is worth the candle. His knowledge may be quite inadequate for the decision but the risks are one way or another mainly personal and his concern alone.

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The gradual extension of immunisation to an increasing number of diseases is rapidly bringing us

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to the stage when we have too much to choose from. Shall I be immunised against small-pox, diphtheria, and typhoid (a standard selection), or shall I choose influenza (by the new method), the common cold (by the old method), and scarlet fever? Shall I be high-brow and fortify myself against psittacosis and tularæmia or prepare myself for a really *grand tour* by having a few shots against the fevers of Malta, the Rift Valley, or the Rocky Mountains? It is quite clear that if I don't want to tattoo myself from head to foot with injections or come out in as many rashes as a chameleon I have got to stop somewhere. My risks of contracting even the commonest of these diseases is usually small—not nearly so great as my risk in crossing the High-street between any Sainsbury's and any Woolworth's.

Can we ever abolish a human disease by a mass immunisation? While the craze is hot we can immunise a thousand or ten thousand, but sooner or later the apostolic zeal wanes, or the available hoardings are wanted for some more fashionable advertisement and the Sisyphean stone once more rolls down the hill and we are much in the position as we were at the beginning. Immunisation surely should remain a matter of private, not of public, venture—a question for the individual to decide on personal grounds and in terms of his own risks, fears, and prejudices.

We see the same impasse reached in the current argument about typhoid inoculation. Sir John Ledingham rightly laughs at the risks of the negative phase. As a distinguished bacteriologist noblesse oblige that he should not be pusillanimous in the exercise of the special methods of his own subject. Your LANCET critic is inclined to pooh-pooh the risks of disease and dwell on the risks of inoculation. He seems to prefer the God-sent to the man-sent risk and perhaps in this he is also right. The Mayor of Croydon is said to have discussed the typhoid epidemic over a dish of watercress. Perhaps he is rightest of all. After all if the chicken had listened to other chickens it would never have dared to cross the road, and it would never have got to the other side—Q.E.F.

PARLIAMENTARY INTELLIGENCE

RISE IN THE COST OF LIVING

IN the House of Commons on Dec. 22nd Mr. LATHAN moved:

"That this House, taking note of the upward trend of prices without a corresponding increase in the income of the average household, is of opinion that the public, especially that section of it already suffering on account of inadequate resources, should be protected by measures for the better organisation of production and distribution and the elimination of profiteering in order to keep the cost of living within proper limits."

He said that in the last four years food prices had risen 16 per cent. Milk was dearer to-day than in any other country in Europe. The desirable amount of milk for children was from one to two pints a day; at present prices 1½ pints a day would cost 3*s.* 4½*d.* a week, more than the sum allowed by the Unemployment Assistance Board for a child under five. In 1933 the cost of a minimum diet was said to be 22*s.* 6½*d.* per week; it had now risen to from 26*s.* 8½*d.* to 36*s.* 2*d.*—figures obtained in the cheapest shops doing ordinary working-class trade.—Mr. RIDLEY, seconding the motion, said that the Government policy was largely to blame for the rise in food prices. The country had gone back in the last five years to economic nationalism.

Mr. RAIKES said that he knew of no better wicket upon which the Government could bat than upon the rising cost of living at present. A fall in the price level would mean a gradual return to the conditions from which the country had drawn itself during the last few years. Cheap talk about the cost of living obscured the fact that to-day the purchasing power of the nation was higher than at any previous time.—Captain MACNAMARA pointed out that the cost of living was considerably higher in France, Germany, Italy, and the United States.

After further debate, Captain EUAN WALLACE, Parliamentary Secretary to the Board of Trade, said that the recent rise in the cost of main foodstuffs was mainly due to the widespread strengthening of demand caused by the general economic revival. During the depression a rise in prices was declared by the leaders of all parties to be an essential condition of recovery. Those who had been in constant employment throughout the depression might be slightly worse off now than four years ago; but there was no doubt that to-day the insured population as a whole was better off. The cost of living index was lower than in 1929, the last year of prosperity, and wages were higher; consumption of food, drink, and tobacco was 20 per cent. greater; the total expenditure on social services had risen from some £468,000,000 in 1930, when the Labour party were in office, to over £503,000,000 in 1935, the last year for which figures were available; to-day 3,000,000 children were receiving cheap and 400,000 free milk; when Labour held office 27,500,000 free meals were given to children by local education authorities, whereas now there were 100,000,000; the sale of milk had gone up by 16,000,000 gallons during the last year. Special attention was being paid to households where a substantial part of the income came from the Unemployment Assistance Board. The first review of cases was completed on Nov. 30th and increased allowances were being made in some 250,000 cases. It would be impossible to run a contributory pensions scheme on the basis that payments should fluctuate with the cost of living; if that were done the 10*s.* old age pension would be worth 6*s.* 9*d.* to-day.

The motion was negatived.

NOTES ON CURRENT TOPICS

The Christmas Adjournment

The House of Lords adjourned for the Christmas recess on Dec. 22nd, and the House of Commons on Dec. 23rd. Both Houses, unless called together earlier in emergency, will reassemble on Feb. 1st.

Coal Bill and Miners' Welfare

On Dec. 20th, when the House of Commons considered the Coal Bill in Committee, a series of amendments which were all negatived were moved to provide for miners certain benefits in the allocation of the surplus. The suggestions included a pension fund for those over 55, funds for improving their conditions, especially in regard to safety, noise, and silicosis, and for displaced miners in general.

Mr. OLIVER STANLEY, President of the Board of Trade, did not think that any contribution that a Commission of this sort could make year by year as its surplus rose or fell, or disappeared, would be in any way a safe foundation upon which a pension scheme, however desirable in itself, could possibly be based. The question of safety must be left for decision by the Royal Commission that was considering this and other matters. Already a large proportion of the cost of research would be borne by the Coal Commission. If work of this sort was being starved for money—and he did not think that there was any ground for saying that—it was surely not right that there should be delay by waiting for the surplus fund to provide a remedy.

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QUESTION TIME

TUESDAY, DEC. 21ST

Compulsory Vaccination at Woolwich Arsenal

Mr. LEACH asked the Secretary of State for War whether he was aware that Cyril Francis Youngman, of 350, Woolwich-road, Charlton, aged 14 years, died from encephalitis resulting from vaccination on Dec. 2nd, the vaccination having been undergone so that the lad could take up a situation at Woolwich Arsenal; that the Minister of Health, in his recent annual reports, had recommended that children of school age and young adults should not be primarily vaccinated unless in special danger of smallpox, as this operation might cause or activate encephalitis; and whether, in view of this case, he would abolish the regulation requiring certain workers at Woolwich Arsenal to be vaccinated.—Mr. HORE-BELISHA replied: I have been made aware of the unfortunate circumstances in which this lad died, and would like to express my sincere sympathy with his family. Such cases are very rare, but I am considering whether the present regulation requiring the vaccination of entrants to the Royal Arsenal should be relaxed.

Prevention of Silicosis

Mr. JAMES GRIFFITHS asked the Chancellor of the Duchy of Lancaster, as representing the Lord President of the Council, if he was aware that an investigation had been conducted by a group of scientists at the McIntyre mine, Ontario, Canada, into the possibility of the prevention of silicosis by the admixture of metallic aluminium with silica dust; and, in view of the claims made that the initial experiments revealed possibilities of successful prevention, if he would undertake to have these experiments studied by his expert advisers and consider the possibility of conducting similar experiments in this country.—Earl WINTERTON replied: The progress of these Canadian investigations is being followed with interest by the special committee advising the Medical Research Council in this subject, and some experiments on similar lines have already been initiated in this country.

Salaried Midwives

Sir ROBERT YOUNG asked the Minister of Health the number of salaried midwives appointed since August 1st, 1937; what was their distribution throughout the counties of England; and whether there had been any difficulty in getting the requisite number required in any part of the country.—Mr. BERNAYS, Parliamentary Secretary to the Ministry of Health, replied: The number of salaried midwives included in the proposals of local authorities, under the Midwives Act, 1936, is approximately 7550, and I am sending the hon. Member particulars of the geographical distribution of this number. I think it is safe to assume that a large majority of the midwives have already been appointed. Returns showing the exact numbers appointed by the end of this year will be available in February next. As regards the last part of the question, my right hon. friend is not aware that any serious difficulty has been experienced in any part of the country in securing the requisite number of midwives.

WEDNESDAY, DEC. 22ND

Asbestosis Certificates

Mr. KELLY asked the Home Secretary if he was aware that Mr. Edmund Ashworth, late of 10, Abbey-street, Rochdale, died on August 17th last of asbestosis, but that the medical board had not issued their certificate in spite of repeated efforts; and would he take steps to expedite the issue of this certificate and to prevent future delay in issuing asbestosis certificates.—Mr. GEOFFREY LLOYD, Under Secretary, Home Office, replied: I understand that exceptional difficulties arose in this case because no application to the Board was made until the middle of September, and when the Board endeavoured to collect the evidence as to the cause of death, it was found that practically none of the material from the post-mortem was still available. The Board reached a decision early in November but subsequently the solicitor who had made the application informed the Board that the widow had died and that a certificate was no longer required. It has been impressed upon the Board that there should be no avoidable delay, but their difficulties are much increased if applications for certificates in fatal cases are not made immediately on the workman's death.

Roller Towels and Infection in Factories

Mr. TURTON asked the Home Secretary whether, in view of the risk of infection attached to the use of roller towels, he would make regulations under Section 42 (2) of the Factories Act, 1937, providing that the provision of roller towels would not be deemed adequate and suitable washing facilities.—Mr. GEOFFREY LLOYD, Under Secretary, Home Office, replied: Roller towels are use in a large number of factories, and my right hon. friend has no evidence at present which would justify him in taking the line that they are generally unsuitable on account of risk of infection. He will however have further inquiry made into the point.

Sleeping-sickness Research: Native's Bravery

Dr. HADEN GUEST asked the Secretary of State for the Colonies whether, in connexion with the recently published annual report of the Colonial Development Advisory Committee, he would ask for the name of the Tanganyika African who was mentioned as having allowed himself, in the course of investigations into the transmissibility of sleeping-sickness, to be infected with the disease, in order that his service to the cause of science and public health might be recognised.—Mr. ORMSBY-GORE replied: The name of the volunteer in question was Ngasa. I should like to take this opportunity of expressing my appreciation of the bravery which has been shown by this man, and others connected with this sleeping-sickness research, in exposing themselves to infection. Ngasa made a most satisfactory recovery.

Health Insurance and Women's Benefits

Mr. BUCHANAN asked the Minister of Health when it was proposed to restore the cuts made in national health insurance benefits to women which were reduced by the Act of 1931, particularly with regard to the improvement in the financial position of the funds and also seeing that almost every other cut made had been restored.—Mr. BERNAYS, Parliamentary Secretary to the Ministry of Health, replied: The reductions to which the hon. Member refers were not due to the needs of national economy but to the increased claims for benefit in respect of women by which the solvency of the scheme was endangered. The number of claims has not fallen to an extent sufficient to enable the question of increased benefits to be considered.

Tuberculosis Services in Wales and Monmouth

Mr. JENKINS asked the Minister of Health when the report of the committee of inquiry into the anti-tuberculosis services in Wales and Monmouthshire would be completed; and whether it was intended to publish the report.—Sir KINGSLEY WOOD replied: No, Sir. I understand that the various bodies who wish to give evidence before the committee are being asked to complete and submit a written summary of their evidence before the end of the year, and the committee hope to hold a public sitting in Cardiff early in the New Year. Further sittings will be necessary before the inquiry can be closed. As regards the second part of the question, I will consider the question of publication of the report as soon as I receive it.

THURSDAY, DEC. 23RD

Leprosy in this Country

Mr. MESSER asked the Minister of Health if he was aware that there was only one small colony for 12 patients suffering from leprosy in this country, and that a Middlesex patient of high infectivity could not be admitted recently owing to lack of accommodation; and if he would sanction financial support to this colony to enable it to be extended to admit all patients deemed to be infective in character.—Sir KINGSLEY WOOD replied: I am aware of the circumstances to which the hon. Member refers. I am advised, however, that prolonged and close contact with an infected

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person is necessary for the transmission of this disease and that in the conditions normally existing in this country the risk of transmission is negligible. I understand further that the patient in question is now in a London hospital and that she will be admitted to the colony as soon as a bed is available. The local authority in whose area she resides are prepared to make a substantial contribution to her maintenance and steps are being taken by the managers of the colony to raise voluntary funds for an extension of the accommodation.

Mr. MESSER asked the Minister of Health how many cases of leprosy in this country had been reported to the Ministry of Health; how many were known to have been contracted here; and how many were regarded as being of high infectivity.—Sir KINGSLEY WOOD replied: Cases of leprosy are not required to be reported to my department, but I have information of 38 such cases which have come to their notice in this country. I know of only 4 cases over a long period of years in which it is considered that the infection was incurred in this country. In each of these there was a history of prolonged and intimate contact with a person who contracted the disease abroad. I have no information with regard to the last part of the question.

Typhoid on s.s. *Strathaird*

Mr. JAMES HALL asked the Minister of Health if he was aware that there was an outbreak of typhoid on board the s.s. *Strathaird* on her last homeward voyage in October; whether any passengers suffering from typhoid were landed at Marseilles; whether the members of the crew were inoculated against typhoid; whether the passengers and crew landed in London who were possible contacts were followed up; and whether or not any of them were traced to Croydon.—Sir KINGSLEY WOOD replied: I am aware of the outbreak to which the hon. Member refers. From the information in my possession it does not appear that any passengers suffering from typhoid were landed at Marseilles. I understand that the members of the crew were not inoculated. The names and addresses of the 329 passengers and of the 233 European members of the crew were sent by the London Port Health Authority to the medical officers of health of the districts of destination. Three passengers and two members of the crew gave addresses in Croydon, and I am informed by the local authority that they were followed up and are reported to have remained in good health.

Mental Hospital Accommodation in Lancashire

Mr. KELLY asked the Minister of Health whether steps were being taken to deal with the shortage of accommodation in Lancashire for mental patients.—Sir KINGSLEY WOOD replied: Yes, Sir; steps are being taken to extend the existing mental hospitals and the Brockhall mental deficiency colony, and to provide a new hospital and a new colony.

Disease Carriers

Mr. GROVES asked the Minister of Health whether, amongst the notifications of disease sent to his department, so-called carriers of disease were included; and whether these carriers were isolated in infectious diseases hospitals or anywhere else.—Sir KINGSLEY WOOD replied: No, Sir. The statutory obligation to send notice of disease to the medical officer of health of the district concerned relates only to persons suffering from the disease and it is only such persons who are appropriate for admission to an isolation hospital. Persons who are known to be potential sources of infection but do not show any clinical symptoms of disease should be normally the subject of appropriate precautionary measures at home.

Health Insurance and Ophthalmic Benefit

Mr. HUTCHINSON asked the Minister of Health how many approved societies gave additional benefit for ophthalmic treatment to all classes of their members; and whether, in the case of societies which did not give ophthalmic benefit to all classes of their members, he would take steps to ensure that ophthalmic benefit, or some modified scale of ophthalmic benefit, should be given to those members not at present entitled to benefit.—Sir KINGSLEY WOOD replied: Ophthalmic benefit is included amongst the additional benefits available to the members of 730 approved societies and 4700 branches, with a total membership of 11,300,000. Members of these societies only become entitled to the benefit after a waiting period of 2½ years on average, but after the completion of the waiting period the benefit is available to all classes of members. Legislation would be necessary to make ophthalmic benefit available to all members of all approved societies, and such legislation cannot at present be contemplated.

Local Government and Public Health in Scotland

Mr. MATHERS asked the Secretary of State for Scotland whether he was now in a position to make any statement as to the prospect of consolidating the Local Government and Public Health Statutes relating to Scotland.—Mr. ELLIOT replied: Yes, Sir. After consultation with the local authority associations I have decided to appoint a representative committee to review the whole field of local government and public health law in Scotland and to prepare the necessary measures for its revision and consolidation. The committee will comprise representatives of the political parties, of the local authority associations, and of the Government departments concerned. Sir John Jeffrey has agreed to act as chairman of the committee. The constitution of the committee is as follows: Mr. George Cruickshank; Mr. Matthew G. Fisher; Sir Robert Hamilton, M.A., F.R.G.S., F.S.A. (Scot.); Mr. William Hutton, M.A., LL.B.; Sir John Jeffrey, K.C.B., C.B.E.; Mr. J. Graham Kerr, M.P.; Mr. J. L. Mackenzie, M.A., LL.B., J.P.; Mr. Norman S. Main; Mr. David Milne; Mr. David Robertson, LL.B.; Mr. P. J. G. Rose, C.B.; Mr. J. M. Vallance, W.S.; Mr. R. Bryce Walker, M.A., LL.B.; and Mr. Joseph Westwood, M.P.

The following are the terms of reference: "With a view to the consolidation of the enactments applying to Scotland and dealing with (*a*) local authorities and local government and (*b*) matters relating to the public health, to consider under what heads these enactments should be grouped in consolidating legislation and what amendments of the existing law are desirable for facilitating consolidation and securing simplicity, uniformity and conciseness."

Alleged Assault by Warders on a Prisoner

In a reply to Mr. McGOVERN concerning injuries received by Francis Healy at Barlinnie Prison on Sept. 10th, 1937, Mr. WALTER ELLIOT, Secretary of State for Scotland, said he was satisfied that no undue force was used by the warders. "Consideration of the course of events in the present case, however, has shown the desirability of ensuring that, if a prisoner whose sanity is in doubt becomes violent, there should be present from the earliest possible moment the medical officer, or, in his absence, the prison governor. Directions, as I informed the House on Nov. 23rd, have been given accordingly."

Smoke Abatement in London

Sir PERCY HARRIS asked the Minister of Health how many prosecutions there had been in London during the last 12 months under the Public Health (London) Act, 1891, and the Public Health Smoke Abatement Act, 1926, for chimneys sending forth smoke in such quantities as to be a nuisance; whether there were any officers of his department detailed to see that the provisions of these Acts relating to smoke abatement in London were enforced; and whether he was satisfied that all the London boroughs were making full use of the powers entrusted to them.—Sir KINGSLEY WOOD replied: The latest information I have is for the year 1936 when two prosecutions were reported. The answer to the second part of the question is in the negative. The statutory responsibility for enforcing the smoke abatement law in London rests on the metropolitan borough councils. The London County Council have certain default powers and also powers of making complaint to me. I have received no complaint of failure by the councils to use their powers.

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CORRESPONDENCE

CARCINOMA OF THE STOMACH

To the Editor of THE LANCET

SIR,—I hope that the correspondence on this subject will not come to an end before definite steps are taken to settle the question in dispute.

I write as an ignoramus, but I am very anxious to know whether cancer is often a sequel of peptic ulcer. It is said that cancer can follow chronic gastritis. It is also said that peptic ulcer may originate in inflammation. Perhaps there is more support for the second statement than the first.

But does a peptic ulcer often become cancerous? Who shall answer this question and on what grounds? The surgeon may be able to diagnose a cancer at operation but he will have difficulty in saying whether it started from a peptic ulcer. He sometimes cannot be certain whether an ulcer is cancerous or not. The radiologist can give an opinion but he is not likely to be dogmatic about doubtful cases. The gastroscopist may recognise the nature of an obvious cancer, but he is not likely to be able to give an opinion with certainty about the less obvious. The morbid anatomist has the best chance and his opinion is the one that should be most seriously considered. There are certain criteria which the morbid anatomist can apply and on the basis of his opinion trustworthy statistics would be built. In his capacity as a histologist he would be able to gather further evidence. But it is to be remembered that on this question even histologists can err.

No amount of theorising nor quoting of authorities is going to settle the question. Let us have the matter thoroughly investigated by physicians, surgeons, radiologists and above all by morbid anatomists of our teaching schools. Let them take time so that they can produce statements that cannot be disputed.

I am, Sir, yours faithfully,

Portland-place, W., Dec. 21st, 1937. CHARLES MILLER.

TREATMENT OF SHOCK

To the Editor of THE LANCET

SIR,—I was much interested in Dr. Walker Tomb's article on shock in your issue of Dec. 18th, having myself put forward similar arguments in favour of the sympathetic theory (*Bgham med. Rev.* 1936, **11**, 131; *Lancet*, 1935, **2**, 1412; *Brit. med. J.* 1935, **2**, 1227). I think it might be dangerous, however, to pass unchallenged the view suggested that spinal anæsthesia is always a good treatment for shock. There is no doubt that under the influence of a spinal anæsthetic the signs of shock will sometimes vanish, but in others they are made worse. I believe the explanation is as follows: In early cases where the amount of plasma lost from the circulation is relatively small, cutting off the painful impulses does good, and there is enough blood in currency in spite of the loss of tone produced in the vessels of the lower part of the body. Where, however, the plasma-loss is more severe the vasoconstriction present is absolutely necessary to carry on the circulation, and it can only be overcome gradually if the patient's life is not to be endangered. In such a case the sudden paralysis of a large part of the sympathetic system increases the collapse and may produce death.

Even in the prevention of shock the protection of spinal anæsthesia is not complete. If we accept the evidence of a rising blood-sugar, sympathetic hyperactivity goes on even in an analgesia to the nipple plane, which means that all sympathetic impulses to the liver and adrenal glands are not cut off, contrary to the teaching of the late Howard Jones. In the cat sympathetic fibres to the splanchnic area have been shown to emerge from as high as the second thoracic nerves. Local reflexes confined to the splanchnic area may also play a part in abdominal operations but these can be stopped by splanchnic block. In "high spinal," therefore, anxiety on the part of the patient will cause a continued secretion of adrenaline, and will also cause sympathetic impulses to be conveyed to those parts of the body unaffected by the analgesic. The patient's anxiety can be reduced by a basal hypnotic, and its effects can be stopped completely by the use of gas-and-oxygen, which apparently has an inhibitory effect on the sympathetic system, as no rise in blood-sugar occurs.

Dr. Tomb's suggestion of treatment with ergotoxine is logical, though like him I have not tried it. A simple method of treatment, however, is to give insulin, which is antagonistic to the sympathetic, in small doses repeated as often as required and controlled if necessary by blood-sugar estimations. Fluids of course should be given to replace loss by sweating and otherwise.

I am, Sir, yours faithfully,

J. W. RIDDOCH.

Hagley-road, Birmingham, Dec. 24th, 1937.

APLASTIC AND ACHRESTIC ANÆMIAS

To the Editor of THE LANCET

SIR,—In your issue of Dec. 11th, Dr. A. F. Zanaty describes the results of sternal puncture in a number of cases which he calls achrestic anæmia; from his findings and certain other points he arrives at the conclusion that achrestic anæmia is a variety of pseudo-aplastic anæmia, and disagrees with our suggestion that it may be related to pernicious anæmia. But Dr. Zanaty's cases present many differences from our published description of achrestic anæmia. The points he quotes in support of his theory are that the cases he examined showed: (1) a macroblastic hyperplasia of the bone-marrow; (2) a marrow less cellular than in pernicious anæmia with many nucleated red cells in small groups; (3) more or less hypoplastic white-cell elements; (4) anisocytosis of the red cells "rarely extreme"; (5) a higher reticulocyte count than in pernicious anæmia; (6) the occasional presence of immature leucocytes; (7) usually a negative van den Bergh reaction; (8) occurrence at a *younger* age than in pernicious anæmia; (9) absence of nervous complications; and (10) a remarkable tendency to hæmorrhage.

Taking these points seriatim, the cases quoted in our final description of achrestic anæmia [1] showed: (1) a type of hyperplasia of the bone-marrow resembling that of pernicious anæmia—i.e., megaloblastic; (2) marrow equally, if not more, cellular than in pernicious anæmia with groups of hæmocytoblasts (megaloblasts) the prominent feature; (3) white-cell elements sometimes hyperplastic and sometimes hypoplastic, as in pernicious anæmia (see Muir [2]); (4) anisocytosis severe when the anæmia was severe; (5) a low reticulocyte count, in the absence of intensive liver therapy—as in pernicious anæmia; (6) immature leucocytes occur occasionally in typical pernicious anæmia; none of our cases of achrestic anæmia happened to show any; (7) the van den Bergh reaction varied from negative to indirect or direct

[1] Israëls, M. C. G., and Wilkinson, J. F., *Quart. J. Med.* 1936, n.s. 5, 69.
[2] Muir, R., Text-book of Pathology, 3rd ed., Edinburgh, 1933.

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delayed—as in pernicious anæmia; (8) we have exceptionally seen pernicious anæmia in a girl of 19; three of our cases of achrestic anæmia were over 60; (9) the patients may not have survived long enough to show nervous complications, which are notable only in a proportion of true pernicious anæmia patients; (10) none of our cases had any hæmorrhage, in fact when discussing the differential diagnosis we state that the presence of hæmorrhage suggested aplastic anæmia.

Dr. Zanaty in a letter in your issue of Dec. 18th has explained what he means by "macroblast." Apparently he feels that since the distinction between "macroblast" and "megaloblast" is difficult in histological sections of bone-marrow, the "megaloblasts" in the bone-marrow of our cases of achrestic anæmia might have been "macroblasts." We agree that it is much easier to distinguish primitive cells of the normoblast series (macroblasts) from primitive megaloblasts in smears of sternal puncture material than in histological sections, but the histological picture of the femoral bone-marrow (which we examined in our cases) is highly characteristic in pernicious anæmia and, in our experience, quite easily distinguished from that of pseudo-aplastic anæmia; this difference is quite irrespective of terminologies and we refer Dr. Zanaty to the descriptions of Turnbull.[3] The histological structure of the bone-marrow in our cases of achrestic anæmia resembled that of pernicious anæmia and not that of the commoner pseudo-aplastic anæmia; hence our suggestions about its ætiology.

The occurrence of typical megaloblastic hyperplasia—as judged by sternal puncture material—in cases of megalocytic anæmia resistant to liver therapy has been reported by Dameshek and Valentine[4] (1937); we have noted such a case ourselves and correlated it with typical histological changes in the femoral marrow exactly like our reported cases of achrestic anæmia.

It will be seen that Dr. Zanaty's cases differ in many respects from our cases of achrestic anæmia; on the other hand, they fit very well the published descriptions of pseudo-aplastic anæmia, and we have little doubt that he has correctly diagnosed them as such. Since they are not examples of achrestic anæmia, we feel that his criticisms of our suggestions as to the ætiology of this anæmia are not valid.

We are, Sir, yours faithfully,

JOHN F. WILKINSON,
M. C. G. ISRAËLS.

Department of Clinical Investigations and Research, Royal Infirmary, Manchester, Dec. 20th, 1937.

MELANOSIS COLI

To the Editor of THE LANCET

SIR,—I was pleasantly surprised to receive a reprint from Sir Arthur Hurst of an article in *Guy's Hospital Reports* on melanosis coli[5] in which he states that "the chief causative factor is not constipation, nor conversion of a constituent of anthracene laxative into melanin, but the artificial diarrhœa produced by aperients of any kind taken on account of constipation." In 1933, in collaboration with J. H. Willard and Joseph Bank,[6] I reported 41 cases of melanosis coli diagnosed by sigmoidoscopy. Since Hurst quotes this article at length and minimises the significance of the anthracenes in their ætiological relationship to melanosis coli, I feel that some comment should be made on his argument. We found that in every patient from whom a detailed laxative history could be obtained (35 cases), one of the anthracene compounds had been used over long periods. It was stated at that time that the anthracene laxatives contain resinous substances and "in the form usually dispensed contain some pigment matter which seems intimately related to the active principle. It seems highly probable that the anthracene laxatives either contain pigment or elaborate a pigment within the colon, which is phagocytised by the deep mucosal cells, causing melanosis coli. Whether melanosis coli can develop in individuals who have not taken any of the anthracene laxatives it is impossible to state. The use of some of the laxatives in the anthracene group dates back to antiquity."

Hurst writes that "the diarrhœa results in excessive putrefaction of protein throughout the colon," and concurs in the opinion expressed by Pick that the melanin results from aromatic protein decomposition products of the contents of the colon under the influence of an oxidative ferment produced by the connective tissue cells of the mucosa. I do not see how it is possible to deny this mechanism for melanin deposits in the bowel, but he has added nothing to prove it. His claim that any aperient capable of causing diarrhœa may result in melanosis is based upon 2 case reports. The first patient had taken senna pods (an anthracene laxative) for sixteen years. No mention was made of the type of aperient used in the second case; apparently the essayist was unable to determine the laxative or laxatives employed. Obviously one cannot set aside a clinical experience in 35 patients with melanosis coli, who had used one of the anthracenes, on any such evidence. We analysed a separate group of 300 patients with constipation without evidence of melanosis. Only 12·3 per cent. of this group had used one of the anthracenes. Most of the patients had been taking non-anthracene laxatives for years, sufficient to cause a soft evacuation, yet melanosis did not occur.

Possibly the statistics of some observers giving a rather high incidence of melanosis coli, proximal to colonic carcinoma have been somewhat responsible for Hurst's views. Macroscopic evidence of melanosis coli in cancer of the colon has been exceedingly rare in our experience. Even though one admits its frequent occurrence in bowel cancer, there is nothing in the literature to indicate that the melanosis in these cases may not have resulted from the use of one of the popular anthracene laxatives.

Sir Arthur Hurst has not presented sufficient proof to cause one to abandon the part played by the anthracenes in the production of melanosis coli. It is my feeling that diarrhœa in association with ordinary putrefactive changes is probably not the cause of this condition.

I am, Sir, yours faithfully,

Philadelphia, Nov. 16th, 1937. H. L. BOCKUS.

WANTED SPECIMENS OF NORMAL SEMEN

To the Editor of THE LANCET

SIR,—The obtaining of material for research is a perennial difficulty. At the present moment I happen to be associated with Mr. B. P. Wiesner, Ph.D., on an investigation of changes in the semen occurring in various types of male infertility. Our chief difficulty at the outset is to obtain sufficient specimens of semen, to serve as "controls," from those who have produced families. I would like to bring particularly to the notice of the staffs of hospitals for

[3] Turnbull, H., in Vaughan's The Anæmias, 2nd ed. Oxford, 1936.
[4] Dameshek, W., and Valentine, E. H., *Arch. Path.* 1937, 23, 159.
[5] Hurst, A. F., *Guy's Hosp. Rep.* 1937, 87, 332.
[6] Bockus, H. L., Willard, J. H., and Bank, J., *J. Amer. med. Ass.* 1933, 101, 1; *Lancet*, 1933, 2, 877.

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women that Dr. Wiesner will gladly undertake semen analysis of the husbands of hospital patients. Since a special technique is employed in the obtaining of specimens, it would be better that husbands should be sent to his laboratory, 37, Gt. Cumberland-place, W.1, so that they may be given instructions. It is hardly necessary for me to add that such work will be done gratuitously.

I am, Sir, yours faithfully,

KENNETH WALKER.

Harley-street, W., Dec. 22nd, 1937.

CHILD DISCIPLINE

To the Editor of THE LANCET

SIR,—Dr. Reginald Miller criticises my psychological methods in your Xmas issue. He takes up my method of curing a young thief by rewarding him for stealing: "Whether the plan works or not we should object to its principle, for it is merely an emotional reaction," says Dr. Miller. This to me is an astounding statement, for juvenile stealing is emotional; it is symbolic; the stolen money or trinkets symbolise the love that the child feels he hasn't got. By giving him a reward (that is a love token) I give the child what he is looking for and he doesn't then require to steal. The other way—the appeal to reason—does not work, naturally, for the fundamental motive is always unconscious. According to Dr. Miller it would appear that it was better to let a boy end in Borstal than to lower oneself to treat him in an emotional way. Yet in another paragraph I find Dr. Miller advocating treatment in an emotional way. On corporal punishment he writes: "It seems wrong to lay it down as a rule that no child should ever be whipped." He writes that after saying that corporal punishment "produces physical pain as well as emotional distress, and is apt to introduce a real element of fear," and he himself says that fear as a factor in routine training is to be avoided at all costs.

Again I find myself astounded. Would Dr. Miller punish a patient suffering from syphilis? Of course he wouldn't but he leads us to infer that he might punish a child who was suffering from a psychological disease. I suppose that the ideal of medicine is to find the root cause of disease and attack it. So, in dealing with a child, the teacher must try to find the root cause. Punishment never cures anything, because it never gets near root causes. Let me give a simple example. John, aged 15, lost his temper with the cook and swore at her hatefully. She complained to me. I sought John. "Got a letter from your mother this morning?" I asked. "Yes," he said, "how did you know?" "What did she write?" I asked. He snorted. "Choked me off cos I wrote her a letter in pencil instead of ink," he said in disgust. Here his anger took as object the best mother substitute—the food-giver. Suppose I had beaten him for his insolence to the cook. I could have made him fear, but his hate against interfering women would have remained unknown to him. My beating would have made him hate not only women but men. By making his action conscious I changed his attitude to the cook. I believe that this is the only possible way to deal with faults in children. Only, of course, the spanking or caning is much easier for the adult.

Dr. Miller is a humane man, yet I fear that his qualified approval of corporal punishment will simply encourage diehards to carry on with the stick. "Miller said it in *The Lancet*, and if he doesn't know, who should?" I am, Sir, yours faithfully,

A. S. NEILL.

Summerhill, Leiston, Suffolk, Dec. 28th, 1937.

CROYDON TYPHOID INQUIRY

TOWARDS the end of his opening statement reported in our last issue Sir Walter Monckton said "I have tried to assist you by marshalling the facts known to the corporation in an endeavour, whatever the consequences, to give you a full, candid and accurate account of the material upon which you have to work." And in conclusion he asked the tribunal to recollect that it is one thing to write field service regulations and lay down principles of perfection which the staff officer, the adjutant, and the commander in the field will endeavour to carry out and apply in practice, but it is quite another thing to determine whether the policy and whether the individual acts of those upon whom the responsibility of the real conflict rests is such that they have failed in the discharge of their duty to apply the principles laid down.

Before the officers of the corporation were called upon two expert witnesses were examined on the sources of the water-supply. Mr. W. S. Boulton, D.Sc., emeritus professor of geology at the University of Birmingham, gave evidence on the physical conditions under which water was obtained at Addington, and Mr. S. R. Rafferty, a consulting engineer, went into the question of the existing water resources.

DR. HOLDEN EXAMINED BY COUNSEL FOR THE CROYDON CORPORATION

Sir Walter Monckton began his examination of the medical officer of health, Dr. O. M. Holden, by taking him over the circumstances that led up to the outbreak. Among the early points which he cleared up was the fact that a case of paratyphoid was notified on Sept. 30th from South Croydon, all the later cases being typhoid except two, one of these quite recent and one in the middle of the outbreak. In reply to Sir Humphry Rolleston, Dr. Holden said that these were both paratyphoid B, whereas the recognised carrier was a typhoid carrier.

Dr. Holden agreed that he first discussed his investigations with the chief sanitary inspector on Oct. 30th and informed the chairman of the health committee that evening. On the same evening a Mr. Rimington called at his house and made suggestions as to dealing with possible causes of the infection which were noted by Dr. Holden; on the following day (Sunday) he went with the borough engineer to Mr. Rimington's house and later attended a meeting of local residents there. At that time six cases of typhoid had arisen in Croydon but he felt it might be inadvisable to make the fact public. "I have no authority myself," he added, "to issue statements." On Nov. 1st he telephoned one of the medical advisers at the Ministry and that morning he sent a sealed letter to some 26 doctors whose names were given in the local directory as situated in the South Croydon area. On the same day he asked the borough bacteriologist to let him have over the telephone the results of any blood tests (Widal) he had arrived at. On Nov. 3rd after a case of typhoid had been reported from Thornton Heath Dr. Holden notified all the doctors in Croydon whose names appeared in the local directory. On that same day there was also a meeting in the town clerk's room just after Dr. Conybeare's arrival from the Ministry. On Nov. 20th he received a message from the laboratory of the Ministry of Health that the excreta of one of the four men, who had been working intermittently in the well as a heading driver, had been found to contain the typhoid organism.

Sir Walter asked Dr. Holden how he was led to

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advise chlorination of the Addington well water, which was done on Nov. 1st. Dr. Holden replied that he had discussed the subject with the borough engineer on Oct. 31st. "Up to that time I was under the impression that all the water-supply in Croydon was chlorinated. It surprised me to hear that that particular supply was not chlorinated, and I suggested that as it was the only unchlorinated supply it should be chlorinated." In giving this advice there were several factors that he was considering. There had been a long period of drought with the possibility that the draw in the well might have been extended on account of the pumping, and he had been looking up reports of the M.O.H. in 1905, '06, and '08, when tests had been carried out on the liability of the Addington well to surface pollution. "I knew of the conditions on the gathering ground and I had," he said, "for some time been a little uneasy about the Addington well."

Sir Walter then referred to some memoranda which had passed, the first being an exchange of letters in December, 1927, between the town clerk and Dr. H. P. Newsholme (who was then M.O.H.), in which Dr. Newsholme wrote:

"The analysis of water . . . cannot be regarded as satisfactory and it suggests some degree of recent contamination in the water collecting area; although the analysis is somewhat anomalous in view of the absence of bacillus coli. . . . I do not suggest here any special measures at the moment apart from continuance of the careful supervision of the filtration arrangements."

On Oct. 15th, 1930, Dr. Holden wrote to the borough engineer as follows:

"I notice in the analyses for drinking water that water from Addington shows bacillus coli in 10 c.cm. This is a higher number than is desirable, and it would appear as if some contamination either from animal or human sources is gaining access to this water. Should this persist it would be wise to consider the advisability of chlorinating the water before its distribution to consumers."

And on Sept. 18th, 1931, Dr. Holden wrote to the borough engineer:

"I notice . . . that the well at Addington shows the presence of bacillus coli in 10 c.cm. This well frequently appears to give this result and it would appear as if there is some soil contamination getting into the water. Should this area become built on to any greater extent and the introduction of cesspools multiplied this may lead to grave danger to the public health. May I suggest that in view of the tendency to the development of that part of Croydon the matter should be inquired into."

On May 6th, 1936, Dr. Holden wrote to the borough engineer remarking again on the presence of *B. coli* in 10 c.cm. of Addington water; "it would appear," he added, "that the filtration of this water is not entirely adequate." The engineer replied on the following day that the filters had been cleansed just before the taking of the sample and no doubt the result was due to the disturbance of the filter. ". . . as you are aware, we have a chlorination apparatus installed at Addington, and if you consider it necessary this could be put into operation, but I think, if possible, it would be better to avoid this."

On Nov. 7th, 1936, Dr. Holden wrote to the borough engineer:

"The results of the water analyses taken on Oct. 30th do not appear to be too satisfactory, more especially with respect to the Addington and Stroud-green wells. The best water appears to be that from Surrey-street. All the others, I feel, in view of the heavy rainfall we are having at the present time should be subjected to chlorination in order to avoid any possible accidents."

And the engineer replied on Nov. 9th: "With the exception of Stroud-green well, all the other supplies are being chlorinated."

These documents having been read to the tribunal, Dr. Holden agreed that he had in mind their contents in giving his advice which led to the Addington well water being chlorinated on Nov. 1st. Although he had advised chlorination at that time he was not then inclined to attribute responsibility to the Addington well, as he was then not quite sure of the area of distribution covered by the water from this well.

Continuing his examination of Dr. Holden on Thursday morning, Sir Walter Monckton returned to the decision reached on Nov. 4th by the public health committee not to make a public announcement then. The Addington well water had been chlorinated from Nov. 1st; on Nov. 4th the well ceased to pump except to Warlingham; on the following morning the water was chlorinated at the outlet of the reservoir. Dr. Holden said he regarded the chlorination undertaken as adequate if the infection was conveyed by water—"until midday on Nov. 3rd we were not at all sure that the infection was water-borne"—and thought that a public broadcast statement that all water should be boiled would cause unnecessary alarm. Circumstances had altered between Nov. 4th and 9th; there had been a large increase in the number of cases and on Nov. 9th what had been intended to be a statement in camera by the chairman of the public health committee was made public. On Nov. 4th he had notified all the doctors in the Croydon area.

Sir Walter then dealt with the extent and nature of the M.O.H.'s responsibilities in the borough. He is not summoned to meetings of the water committee and does not receive copies of its agenda or of its written minutes. His annual reports have not (nor have those of his predecessor) dealt with the water undertaking. He has not been called upon to prepare evidence for inquiries about the water-supplies. The monthly samples of water are selected by another officer of the corporation and submitted to the analyst. Dr. Holden said he had not been consulted about the work carried out by the water department and did not know what was being done on the Addington well until he learned of the fatal accident in the well through an account in the local press. Information had not been put before him about the plans of new houses in connexion with the gathering grounds.

Sir Walter read passages from the Sanitary Officers (Outside London) Regulations, dated Nov. 7th, 1935, which laid down (inter alia) that:

"A medical officer of health, in respect of the district for which he is appointed, shall (1) inform himself as far as practicable respecting all matters affecting or likely to affect the public health in the district and be prepared to advise the local authority on any such matter. . . ."

In response to Mr. Murphy, Sir Walter said he was not aware of anything in the regulations imposing on the medical officer of health any particular duties or responsibilities with regard to water-supply.

In reply to Sir Walter's question whether he had advised inoculation, Dr. Holden said he consulted with the bacteriologist and on his advice (and in confirmation of his own opinion) considered that as in all probability the infection had already taken place before they were aware of it, it would be risky to advise inoculation and would not in fact prevent the onset of typhoid. Dr. Holden added that at the meeting of the local profession on Nov. 10th the views put forward were diametrically opposed to one another.

On behalf of the Croydon division of the B.M.A., Mr. Forbes interposed to say that he made no point about inoculation. Had the medical officer conferred with the profession generally in the borough he would have found a division of opinion. Dr. Holden

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remarked that one point put forward was that inoculation complicated the diagnosis of a case.

DR. HOLDEN EXAMINED BY HIS OWN COUNSEL

Mr. Sandlands (instructed by Messrs. Le Brasseur and Oakley for the London and Counties Medical Protection Society) questioned Dr. Holden about the increase in the duties of a medical officer of health during the last 20 years. Throughout the whole of that time water had never been put upon the M.O.H. except to advise when the reports were sent in. The year 1920, said Dr. Holden, seemed to be the last date on which the M.O.H. had anything to do with the water-supplies.

In reply to a question from Mr. Thesiger, Dr. Holden agreed that on Oct. 31st, when he learned from the borough engineer that the water at Addington well was not then being chlorinated, the borough engineer himself appeared to be very surprised at having found that this was so.

DR. HOLDEN CROSS-EXAMINED BY COUNSEL FOR THE SOUTH CROYDON TYPHOID OUTBREAK COMMITTEE

Mr. Lyons began by asking Dr. Holden about the limit of his present responsibility for the water-supply. "To advise the responsible authority on the bacteriological analyses," Dr. Holden replied, "as that is the only material put before me." He agreed he had made recommendations to the principal officer concerned—viz., the borough engineer. At the end of 1930 he had advised as regards one particular supply that the question of chlorination should be considered by the borough engineer. He was under the impression that chlorination at the Addington well had been in force since 1936. He had a memorandum from the borough engineer to that effect dated Nov. 9th, 1936, "in reply to your memo of the 7th inst. . . . with the exception of Stroud-green well, all the other supplies are being chlorinated." He was satisfied that what he had recommended was being done.

Mr. Lyons asked was or was not the water from Addington chlorinated before this trouble. Dr. Holden said he understood it was chlorinated intermittently. How long and for what purpose he did not know.

In reply to further questions Dr. Holden said he had examined from time to time the gathering grounds. He had never been asked by the water committee for advice on them. They had been the cause of some uneasiness of mind to him and he had watched continually the bacteriological analyses of water of this particular well.

Mr. Lyons then asked Dr. Holden if he accepted as a true statement of fact in his report for 1935 that "a constant supply of water was maintained throughout the year and has been satisfactory both in quality and quantity." That statement, said Dr. Holden, was given to him by the borough engineer. Mr. Lyons suggested that in view of the correspondence in 1931 Dr. Holden had allowed his report of 1936 to go out to the people of Croydon knowing that it was inaccurate and untrue. This Dr. Holden denied, and also the suggestion that he had omitted to say what he really knew.

(At this point the nature of Mr. Lyons's questions led Dr. Holden's counsel to point out that there was no absolute privilege in the tribunal and that anything said there might be the subject of an action later.)

Mr. Murphy now intervened to ask Dr. Holden whether a statement that "monthly analyses of the water were made at the five pumping stations and in many cases at more frequent intervals" was true in 1936, and Dr. Holden replied that the statement was not his but was given him by the engineer. It would not be accurate for 1937 but he had no reason to disbelieve that it was accurate for 1936.

Mr. Lyons then dealt with the question of cesspits, and asked Dr. Holden if it was correct to say there were only a few houses and bungalows in remote positions where the sewage went into such pits and Dr. Holden agreed. Hayling-grove was not remote but a cesspit there had not been used for four years. He knew of the cesspits in the Addington gathering grounds. It was perfectly correct under the Public Health Acts for a house to be erected with a properly constructed cesspit.

Questioned about the gathering ground Dr. Holden said he drew the attention of the responsible official to his ideas about that. He was not aware of the ground where four or five hundred people camped each week-end just outside Croydon borough. It was outside his area. He had heard of it now. There was no evidence that a nuisance was being caused by the encampment. He agreed that there was no convenience of any sort there but the distance was considerable between the camping ground and the well. Had he received information about the gathering ground, he would have watched the analyses in exactly the same manner as he now had done. Fisher's Farm was in such a position that he could not connect it up to any main drainage. These things had been there ever since (and he believed before) the well was sunk. His attention had been drawn to the pig farm about two and a half miles away at the beginning of the outbreak and he had been in collaboration with the medical officer of Purley about it.

Questioned about the unfortunate fatality to a workman in the well, Dr. Holden agreed that his first intimation was a press report of the accident. He was given to understand that when the fatality occurred work ceased. It would have been outside his province to say "This must stop, I must be in charge of this position." He had confidence in the borough engineer in charge of the work. If the engineer were in doubt he had not the slightest hesitation in thinking he would ask him.

Asked when he found out that work in the well had recommenced Dr. Holden said he did not find out directly; it was found out for him by Dr. Conybeare. When it came to his knowledge on Nov. 13th the work had already stopped. Men were working down the well from the end of September to the end of October. He did not know under what conditions they had been employed. "It is difficult for me," said Dr. Holden, "to know of work being carried on in a well unless I am told about it." "Do you not think," said counsel, "that the medical officer of health has power to give directions, not mere advice, on matters in which he thinks the public safety may reasonably be put in jeopardy?" "It depends," said Dr. Holden, "on the directions" and also, he added, on the internal working of the local authority.

Counsel: "I hope you recognise that in a matter of that nature there is no limit to the authority you have, or that any medical officer has."

Dr. Holden: "There are very definite limits. . . . I can only give advice to my committees."

Counsel: "I am afraid, if I may say so with every respect, you do not appreciate the position of a medical officer of health in all circumstances."

At this point Sir Walter Monckton interposed to ask whether Mr. Lyons was suggesting that by the operation of the Act of 1933 Dr. Holden was really

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put in the position that he could give a direction over the heads of the committee.

Mr. Lyons: "In my submission, on a matter affecting the health of the people, the medical officer does not finish by saying 'I recommend so and so' and that is the end. I suggest that he says 'I direct in pursuance of the duty I have that this shall be done.' . . . I do not say that the medical officer can go out and pledge the corporation's credit for having the work done, but he can insist that the work shall be done, and he can bring the matter to the Minister of Health. He can go to the committee and say 'If you do not take notice I shall go to the Ministry.'"

Sir Walter Monckton: "That is not a direction."

Later on Mr. Lyons questioned Dr. Holden about the behaviour of a carrier. A carrier of typhoid, said Dr. Holden, may be in normal health and exhibit no observable symptoms. The Widal test was not absolutely conclusive but a very strong indication. A person might be a urinary carrier or a fæcal carrier and there were intermittent carriers.

Mr. Lyons questioned Dr. Holden about a conversation with Mr. Rimington and Mr. Moss on Oct. 31st when he was asked whether he thought the water-supply was a source of infection. He certainly did not use the word "inconceivable" but might have said that he could not suspect water until he had eliminated other factors. At that time the borough engineer was under the impression, as he was, that the water was chlorinated.

In answer to a later question Dr. Holden said he would like to emphasise that in any outbreak of typhoid or paratyphoid there were many factors to take into consideration. Water, food, personal contact, or personal relationships all had to be considered—and on Oct. 31st when four cases had arisen there was no evidence which could direct him in particular to incriminate any article either of food or drink.

Further cross-examined on Dec. 28th, Dr. Holden stated that the borough engineer, like himself, was under the impression that chlorination had been continuous. He could not himself find the exact dates of chlorination. He gave no instruction to sample tap water in the houses from which four cases were notified on Oct. 30th; water was not always the most obvious cause of typhoid. He did not warn the matron of a nursing-home in St. Augustine's-avenue which obtained its water from the high level source; each patient there had a private doctor and the doctors had been warned. He did not agree that the measures taken against the danger were unsuccessful; even 300 cases were a comparatively small figure for a water-borne outbreak; he had expected more. Replying to Mr. Forbes, who represented the local division of the B.M.A., Dr. Holden said that his letter to local doctors on Nov. 4th said nothing to indicate that the source of infection was water, because he was not sure.

HEALTH OF THE NAVY

An improvement in the Navy's general health is shown by a decrease in the returns for disease and injury in the annual report for 1935,[1] and the number of men sick daily was the lowest on record—namely, 1569 (18·17 per 1000) in an average total strength of 86,345. The lowest sick-rate was in the America and West Indies station and the highest in the Irregular list, which includes the crews of warships on passage to or from foreign stations, thus containing a large proportion of invalids. Altogether 1304 men were invalided, an increase on the previous year and on the preceding five-year period; of these, 13·94 per 1000 were due to disease and 1·15 to injury. This total also includes 937 men finally invalided (10·85 per 1000); pulmonary tuberculosis was the commonest cause, accounting for 169; errors of refraction came second with 112, and injuries third with 100.

The specialist medical officers are devoting particular attention to diseases of the stomach and intestines, which has been steadily increasing for some years. There were 2944 cases in all, gastritis, gastro-enteritis, and enteritis being responsible for 1605, and appendicitis for 449. The common cold, influenza, and tonsillitis are still the commonest causes of sickness and cost the Navy some 160 years' loss of service in the twelve months. The standards for eyesight are being relaxed further and now spectacles may be worn on duty by all except officers of the executive branch and ratings of the seaman and signal branches. With these concessions and the more precise methods of examination it is expected that wastage due to sub-standard eyesight will be even more reduced. Though the incidence of pulmonary tuberculosis is very much lower than in the groups examined in the merchant navy, the position is still unsatisfactory. The problem is complex and is being investigated in conjunction with the Medical Research Council and the Royal College of Physicians of London. Unremitting attention is being paid to the selection of personnel, to the environment on board ship, and to the diet. Modern methods of diagnosis may help to eliminate candidates showing the early signs and to detect the disease among the serving personnel, but the effects are by no means certain.

The incidence of venereal disease continues to fall, with 254 fewer fresh cases of gonorrhœa than in 1934, the total being 3572, but new cases of syphilis remained stationary. The China station was the worst affected, the proportions per 1000 being 100·11 for gonorrhœa and 93·56 for syphilis. Fungoid infections of the feet (epidermophytosis, "athlete's foot") are increasing and becoming geographically more widespread; all but the mildest cases require prolonged and careful treatment. In some ships abroad as many as 45 per cent. of the complement were infected. Preventive measures include suitable footwear in hot stations, steam laundering of towels, tiling of bathrooms, frequent inspection to detect early cases, and lectures to the men on foot hygiene. In the Persian Gulf, through encouragement to the men to work barefoot the incidence declined and there was also a readier response to treatment. The measures recommended for disinfecting fresh fruit and vegetables—immersion in boiling water for 30 sec. or in strong potassium permanganate for 30 min.—have been found to be ineffective. They are considered likely to produce an ill-founded sense of security and it is urged that all fresh vegetables should be cooked.

There were 6125 surgical operations in the naval hospitals or in the hospital ship *Maine*, besides a considerable number in ships at sea and in other shore establishments. The increasing use of the Winnett Orr method of immobilising compound fractures and osteomyelitis produced excellent results and economy of staff, time, and dressings. Evipan has proved a valuable anæsthetic for medical officers afloat, especially in single-handed operations.

The total death-rates for the last two years were the lowest on record, being 1·96 per 1000 in 1935. Pneumonia (13) and pulmonary tuberculosis (15) and appendicitis (10) head the list of diseases, but violence was responsible for 48 (25 from wounds, fractures, &c., 13 from suicide, and 8 from drowning).

[1] Report on Health of the Navy. H.M. Stationery Office. 2s. 6d.

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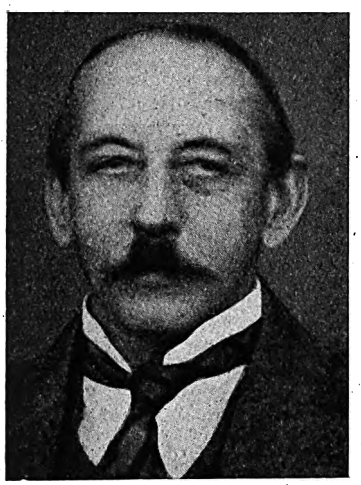
OBITUARY

GEORGE ALFRED BUCKMASTER, D.M. Oxon., F.R.C.S. Eng.

Prof. G. A. Buckmaster, who has been described as one of the last of the great Edwardians in scientific medicine, actually spent his early professional life in Victorian days; for he was 78 when he died last week, though he looked much younger. The son of John Charles Buckmaster of the Science and Art Department, South Kensington, George Alfred was as a boy the pickle of a large family whose members were destined to acquire fame: one of his brothers became Lord Chancellor of England, one a distinguished educationist, another a well-known painter.

George Buckmaster went to Magdalen College School, where his eldest brother was assistant master, and thence, in 1877, as a demy to Magdalen College, Oxford. He did well in natural science, obtaining a first-class in 1881, and was awarded the Burdett-Coutts scholarship in geology in 1882. He studied medicine at St. George's Hospital, qualifying in 1883, and for the next three years he held a Radcliffe travelling fellowship, working at various foreign universities, including Leipzig, Kiel, Göttingen, and Berlin. One of his earliest pieces of research work, on tetanus, was published in a German journal. He took his Oxford medical degree in 1885, and became D.M. in 1887, acquiring a D.P.H. in the same year. His scientific equipment fitted him for selection as one of the three English members of the Leprosy Commission in India, 1890–91. This commission reported in 1892 and its sane conclusions and suggestions might be studied with advantage even to-day.



PROF. BUCKMASTER

On his return home George Buckmaster started his career in physiology, becoming a professor on the staff of the Royal Veterinary College and an assistant professor at University College, London, where he soon achieved popularity as a vivid and stimulating lecturer. Students appreciated his inexhaustible fund of anecdotes about the pioneers of physiology and the wide range of his general as well as his special reading. His main interest at that time was in the morphology of blood—he held strongly to the belief that blood platelets were artefacts—and in its function, especially the mode of carriage of oxygen and carbon dioxide. His monograph on the "Morphology of the Blood" (1906) was acclaimed as a distinguished contribution to the subject. He collaborated with J. A. Gardner in work on blood gases and on the physiology of anæsthesia, mostly published in the *Proceedings* of the Royal Society. With Gardner he invented a neat device in the shape of a blood gas pump which had no taps and therefore could not leak; by means of this instrument they were able to show that the amount of free nitrogen in blood is small but constant.

In 1919 Buckmaster succeeded Stanley Kent in the chair of physiology at the University of Bristol, where he soon won the affection and admiration alike of students and colleagues. He kept this appointment until he retired from active professional life in 1930, retaining only his examinerships. In 1934 he was made F.R.C.S. Eng. and was immensely proud of this honour, which he had earned as a devoted and faithful servant of the college; he twice made the journey to Australia and New Zealand as an examiner when he was already over 70, and only two years ago he visited India to conduct the physiology part of the primary fellowship examination in Calcutta. A co-examiner on such visits expresses the admiration everywhere felt for this "marvellous old man" whose contacts had been so many and so wide, and the conviction that no guest had ever been more welcome in either the social clubs or the academic circles of Australia and New Zealand. Buckmaster's prodigious memory, his brilliant talk, and the clever stories he told would indeed hold spellbound an audience of any profession or rank. He had an astonishing fund of information and very varied interests; for instance a visitor to his laboratory at Bristol one day found him trying to rear a family of glow-worms on a plentiful diet of snails. He was fond of an argument up to a point; if it seemed to go against him he would jump up and fetch the violin on which he played with almost professional skill. As a letter-writer he was superb, and in this as in other qualities he seemed to belong to a fuller and more leisured age.

A friend writes: "Buckmaster abhorred intellectual dishonesty or even pretentiousness, and he had nothing but scorn for spurious claims to knowledge. Around him gathered a few cronies, distinguished like himself in scholarship and erudition. One of the closest of these, Prof. William Wright, died only a few months before him. He relished also the company and friendship of a younger set to whom he stood as a wise and benevolent mentor, dignified with the atmosphere of other times and other places. It was a tragic irony that with him, as with Baudelaire, an aphasia should have marred the closing days of one who so loved speech and possessed such mastery over language."

George Buckmaster married Amy Elizabeth, daughter of Charles Brooks, who survives him with one married daughter. His only son died in Ireland just after the war.

CHARLES SANDERS, M.B. Lond.

DURING long tenure of office as medical officer of health for the London borough of West Ham Dr. Sanders worked devotedly for his locality. Qualifying from St. Bartholomew's Hospital in 1881, he held resident posts at the Queen's Hospital, Birmingham, and was appointed to West Ham in 1887. The 37 years in which he controlled his department were years of rapid expansion, in which the population rose from 186,000 to 314,000, and in which the administrative side of public health increased out of all knowledge in complexity. The leading characteristics of Sanders as a chief during this formative period of the health services were his cheerfulness, his capability, and his fair dealing. One of his staff writes of his energy and his readiness to sacrifice

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his own pleasure and leisure, and of the confidence his strong personality inspired; the entire staff, he says, felt at all times that they could be sure of his treating them justly. He was always ready with sound advice for those who asked it, and he won the affection of those that worked with him. On his retirement in 1924 he received warm testimonials from the public health department and the school medical service. Besides acting as M.O.H. and S.M.O. he formerly held the appointments of surgeon to the West Ham Hospital and medical officer to the London and India Docks Joint Committee. He was elected president of the Society of Medical Officers in 1917 and also presided over the local branch of the British Medical Association. To the profession in the neighbourhood he was a welcome collaborator.

DR. SANDERS

Dr. Sanders died at his home at Kew on Dec. 18th at the age of 78. His wife survives him.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED DEC. 18TH, 1937

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2565; diphtheria, 1568; enteric fever, 24 (27 "expected"); pneumonia (primary or influenzal), 1118; puerperal pyrexia, 153; cerebro-spinal fever, 24; acute poliomyelitis, 10; acute polio-encephalitis, 1; encephalitis lethargica, 2; dysentery, 411; ophthalmia neonatorum, 81. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases of dysentery notified during this week is 30 less than last and 44 less than two weeks ago. A large proportion of the cases were reported from the home counties—e.g., London 127, Middlesex 43, Essex 33, Sussex West 14, Surrey 10, Kent 8, Sussex East 7; other counties with considerable numbers being Devon 42, Notts 22, Norfolk 21, Staffs 18, Chester 14, Lancaster 12, Glamorgan 11.

The number of cases in the Infectious Hospitals of the London County Council on Dec. 24th was 4077, which included: Scarlet fever, 801; diphtheria, 1512 (diphtheria carriers, 30); measles, 392; whooping-cough, 349; puerperal fever, 12 mothers (plus 8 babies); encephalitis lethargica, 283; poliomyelitis, 3. At St. Margaret's Hospital there were 19 babies (plus 6 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox, 6 (5) from enteric fever, 22 (0) from measles, 4 (0) from scarlet fever, 22 (8) from whooping-cough, 49 (6) from diphtheria, 57 (15) from diarrhœa and enteritis under two years, and 52 (11) from influenza. The figures in parentheses are those for London itself.

Five deaths from typhoid were reported from Croydon, 1 from Portsmouth. Liverpool had 7 fatal cases of measles, Manchester 4. Liverpool also reported 7 deaths from whooping-cough. Diphtheria was fatal in 29 great towns, Liverpool reported 8 deaths, Hull and Sheffield each 3.

The number of stillbirths notified during the week was 294 (corresponding to a rate of 46 per 1000 total births), including 38 in London.

MEDICAL NEWS

University of Cambridge

At recent examinations the following candidates were successful:—

THIRD EXAMINATION FOR M.B., B.CHIR.

Part I, Surgery, Midwifery, and Gynæcology.—J. Arnott, J. L. W. Ball, C. H. Bartlett, A. H. Baynes, J. R. Bignall, G. Bourne, R. I. C. Bradford, B. R. Bray, R. W. W. Brown, L. H. Cane, D. M. Carding, I. C. Chopra, A. C. Clark, M. J. Clow, J. Clutton-Brock, P. C. Conran, E. Cronin, A. J. Daly, E. B. Davies, C. H. C. Dent, A. P. Dick, W. D. Doey, K. W. Donald, G. W. N. Dunn, N. B. Eastwood, T. A. W. Edwards, G. P. Fox, E. K. Gardner, O. D. Gilmore, M. H. Harmer, W. J. Hay, J. S. Heller, H. G. W. Hoare, R. D. Holloway, G. N. Hunt, H. M. James, R. M. Johnstone, E. P. Jowett, P. A. Knill Jones, J. Laughlin, J. W. Lillico, G. M. Little, A. G. Marshall, B. E. Miles, R. O. Murray, J. C. B. Nesfield, G. F. Panton, J. S. Phillpotts, J. G. B. Platts, B. H. Price, J. S. Prichard, G. C. Pritchard, J. H. B. Round, D. Russell-Davis, J. Smith, P. M. Smythe, H. Stott, J. Sutcliffe, R. J. D. Temple, J. R. T. Turner, A. J. Walton, J. M. Watson, H. F. Whalley, D. O. Wharton, B. D. Whitworth, E. H. L. Wigram, M. M. Wilson, J. W. Wood, P. J. Wormald, G. M. Wright, and J. Yudkin.

Part II, Physic, Pathology, and Pharmacology.—G. E. Adkins, D. A. P. Anderson, T. L. Barbour, C. F. Barwell, R. D. I. Beggs, A. S. Bookless, A. W. Box, J. B. Bunting, G. A. Burfield, A. L. Cochrane, S. B. Darbishire, J. K. Denham, W. D. Doey, E. W. Dorrell, L. C. de R. Epps, T. J. Fairbank, A. L. Fawdry, W. Goulstone, J. L. Griffith, E. B. Hacking, S. W. G. Hargrove, F. E. S. Hatfield, H. G. W. Hoare, J. H. S. Hopkins, C. W. Hutt, R. T. Johnson, H. S. Kellett, G. J. G. King, A. P. Kitchin, J. I. H. Laurie, S. A. H. Lesser, R. W. Mason, R. M. Miller, K. S. Mullard, T. L. Oliver, B. G. Parsons-Smith, G. R. C. Peatfield, P. A. T. Phibbs, A. L. Phillips, H. L. Porter, C. G. Rob, D. Rubin, G. Sheers, J. Sutcliffe, V. E. A. Sykes, R. D. Teare, D. J. D. Torrens, R. L. Townsend, R. C. H. Tripp, S. C. Truelove, N. Vere-Hodge, J. H. Ward, S. R. F. Whittaker, J. M. G. Wilson, M. C. Woodhouse, G. H. Wooler, and J. D. Younghusband.

University of London

At recent examinations the following candidates were successful:—

ACADEMIC POST-GRADUATE DIPLOMA IN CLINICAL PATHOLOGY

Tatjana von Haebler.

EXTERNAL DIPLOMA IN CLINICAL PATHOLOGY.

C. E. W. Hoar.

THIRD EXAMINATION FOR THE B.D.S.

R. L. Kenyon and A. D. Renson.

Society of Apothecaries of London

At recent examinations the following candidates were successful:—

Surgery.—F. B. Akeroyd, Univs. of Camb. and Leeds; J. S. Lancaster, Univ. of Camb. and St. George's Hosp.; and J. D. B. Perkins, Guy's Hosp.

Medicine.—F. Bastawros, Royal Colleges, Edin.; F. C. E. Diamond, Univ. of Durh.; and D. C. Light, Guy's Hosp.

Forensic Medicine.—F. Bastawros, Royal Colleges, Edin.; F. C. E. Diamond, Univ. of Durh.; and D. C. Light, Guy's Hosp.

Midwifery.—J. M. Hardy, Univ. of Manch.; P. H. Hay-Heddle, Westminster Hosp.; and R. Lipkin, Univ. of Liverp.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery: F. Bastawros, F. C. E. Diamond, and D. C. Light.

National University of Ireland

At recent examinations at University College, Cork, the following candidates were successful:—

M.D.

Thomas O'Neill.

FINAL EXAMINATION FOR M.B., B.CH., B.A.O.

J. C. Dundon (first class honours); J. A. Allen, Patrick Buckley, Patrick Coffey, J. C. Dundon, K. A. Flaherty, F. S. Kelleher, D. J. G. Maher-Loughnan, Coleridge Marchment, E. F. Mulcahy, Ellen M. M. Murphy, Patrick Murphy, J. S. O'Mahony, and P. J. Ryan.

Part I.—Mary Corbett, John Hutch, Loretto Kelly, D. J. R. McConvell, David O'Keeffe, Patrick O'Keeffe, and Mary F. O'Leary.

Part II.—C. J. Clohessy, G. R. Cubitt, James Fitzgerald, J. G. Paton, and M. F. Ronayne.

Royal Society of Medicine of Budapest

Mr. Leslie Paton has been elected an honorary member of this society on the occasion of the centenary of its foundation.

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University of Bristol

At recent examinations the following candidates were successful :—

FINAL EXAMINATION FOR M.B., CH.B.

Section II.—R. L. J. Derham, H. D. T. Gawn, M. E. M. Herford, F. J. W. Hooper, G. L. Page (with distinction in public health), and Anna H. Silberstein.

Group II, completing examination.—P. N. Heron and P. K. Jenkins.

L.D.S.

H. B. Harding and J. C. F. Rolls.

Queen's University, Belfast

Dr. Richard Hunter has been appointed secretary of the university.

Demonstrations of Contraceptive Technique

On Thursday, Jan. 6th, at 2.30 P.M., a practical demonstration of the technique of the use of a variety of contraceptive methods will be given at the C.B.C. Clinic by Mrs. Marie Stopes, D.Sc., and Dr. Evelyn Fisher. Medical practitioners and senior students should apply for tickets to the hon. secretary, C.B.C., 108, Whitfield-street, London, W.1.

Regional Coördination of Voluntary Hospitals

The Voluntary Hospitals Commission recommended the division of the country into hospital regions, the formation of regional councils to correlate their work and needs, and the establishment of a central council to coördinate the work of the regional ones. The British Hospitals Association has set up a provisional central council to advise how these recommendations may best be carried out. The members will include Mr. S. P. Richardson (chairman), Mr. Arthur Morley, K.C. (vice-chairman), Mr. R. G. Hogarth, F.R.C.S., Prof. A. W. Sheen, F.R.C.S., and two representatives to be appointed by the British Medical Association. Mr. R. H. P. Orde is the hon. secretary.

The Oxford and Bath Congresses on Rheumatism and Hydrology

The International Congress on Rheumatism and Hydrology, which is to be held in Oxford from March 25th to 31st, has been convened by the International Society of Medical Hydrology and the International League against Rheumatism. The president-elect is Sir Farquhar Buzzard and the chairman of the British organising committee Sir Humphry Rolleston. There will be two main subjects for discussion. The first, wet and dry climates and weather in the causation of disease, will be introduced by Prof. G. Danischewsky (U.S.S.R.), Dr. G. Edström (Sweden), Prof. de Rudder (Germany), and Dr. E. P. Poulton. The second, juvenile rheumatism, will be considered under four aspects, and the principal speakers will include Prof. F. Klinge (Germany) and Dr. A. G. Gibson, pathological aspect; Prof. L. Findlay and Dr. H. Grenet (France), clinical aspect; Dr. Wilfrid Sheldon, therapeutic aspect; and Dr. F. J. Poynton and Prof. Danischewsky, social aspect. Visits will be paid to hospitals in London on March 26th. Arrangements are being made for the accommodation of congress members in colleges at Oxford, and there will be visits to Leamington Spa during the meeting and to Droitwich at the end. The congress is open to medical men and scientists who are not members of either body. Inquiries should be addressed to the general secretary at 109, Kingsway, London, W.C.2.

The Bath Bicentenary Congress on Chronic Rheumatism is to be held to commemorate the bicentenary of the Bath Royal National Hospital for Rheumatic Diseases from March 31st to April 3rd. It will thus follow directly after the international meeting at Oxford, and the speakers are to include authorities on rheumatism from France, Germany, Holland, Sweden, and other countries. The meeting will be opened by Lord Horder on the Thursday evening, and the following day will be devoted to a discussion on gout and rheumatism of metabolic origin. On Saturday papers will be read and next morning there will be a demonstration of cases at the hospital. The meeting will be open to all practitioners, and further particulars may be had from the honorary secretary of the congress at the Royal National Hospital for Rheumatic Diseases, Bath.

Broadcasting Talks

On Jan. 7th the first of nine Friday morning talks on sickness in the house will be given. The talks will be given by doctors and nurses, and will deal with the care of invalids and old people. Later there will be three talks on the problems of adolescence.

Appointments

BELL, R. B., M.R.C.S. Eng., Assistant (Deputy) Medical Officer at New Cross Hospital, Wolverhampton.

DAVIS, W. B., M.D. Belf., D.P.H., Pathologist to the Victoria Hospital, Blackpool.

DIXON, IRENE, M.B. Lond., D.P.M., Assistant Woman Medical Officer in the Headquarters Branch of the Post Office.

GILL, T. P., M.B. Aberd., F.R.C.S. Edin., D.L.O., Hon. Surgeon to the Ear, Nose, and Throat Department of the Kent County Ophthalmic and Aural Hospital, Maidstone.

HARDING, H. E., F.R.C.S. Eng., Clinical Assistant to the Fracture and Orthopædic Departments of King George Hospital, Ilford.

HILL, T. R., M.D., M.R.C.P. Lond., Diagnostic Physician to the Tavistock Clinic, London.

LEWIS, R. I., M.D. Lond., Medical Superintendent at the Hospital for Tropical Diseases, London.

MCCARTAN, WILLIAM, M.D. Belf., M.R.C.P. Lond., D.P.H., D.P.M., Medical Superintendent at the Brighton County Borough Mental Hospital, Haywards Heath, Sussex.

PRIEST, P. D., L.D.S. R.C.S., Dental Registrar at the London Hospital.

RAE, L. J., M.B. Camb., D.M.R.E., Assistant Radiologist in the London Hospital.

SANDIFER, P. H., M.R.C.P. Lond., House Physician at the National Hospital, Queen-square, London.

SMITH, E. R., M.D. Liverp., D.P.H., District Tuberculosis Officer for Cheshire.

STEWART-WALLACE, A. M., M.D., M.R.C.P. Lond., Resident Medical Officer at the National Hospital, Queen-square, London.

UTTING, ERGENWIN A., M.R.C.S. Eng., Assistant Woman Medical Officer in the Headquarters Branch of the Post Office.

VICK, R. M., M.Chir. Camb., F.R.C.S. Eng., Hon. Consulting Surgeon to the Bexhill Hospital.

London County Council Hospital Staff.—The following appointments are announced. D.M.S. (I) or (II) = Deputy Medical Superintendent Grades I or II. A.M.O. (I) = Assistant Medical Officer Grade I.

DORLING, G. C., F.R.C.S. Eng., D.M.S. (I), Lewisham;
PRICE, I. I., M.B. Lond., F.R.C.S. Eng., D.M.S. (I), St. Mary, Islington;
GABE, JOEL, M.B. Lond., F.R.C.S. Eng., D.M.S. (II), St. Andrew's;
WIMBUSH, H. G., B.A. Camb., M.R.C.S. Eng., D.M.S. (II), Hammersmith; and
JONES, A. N., M.B. Liverp., F.R.C.S. Eng., D.C.O.G., Senior A.M.O. (I), St. Pancras.

Queen Charlotte's Maternity Hospital, London.—The following appointments are announced :—

DICKINSON, J. R., M.B. Camb., Assistant Resident Medical Officer;
GLENNIE, EVELYN W., M.B. Glasg., Resident Anæsthetist and District Resident Medical Officer; and
REED, GRACE E., M.B. Lond., Resident Anæsthetist.

Births, Marriages, and Deaths

BIRTHS

PATERSON.—On Dec. 27th, the wife of Dr. A. S. Paterson, Cheyne Walk, Chelsea—a son.

ROCHE.—On Dec. 25th, 1937, at 7, Knaresborough-place, S.W.5, the wife of Alex. E. Roche, F.R.C.S.—a daughter.

ROWE.—On Dec. 21st, at Blackheath, to Dr. C. Isobel Rowe (née Pattullo), wife of Flight Lt. F. C. T. Rowe—a son.

MARRIAGES

DIXON—TABOR.—On Dec. 21st, at S. Mary, Bocking, John Hardy Dixon, M.B., to Winifred Hope, younger daughter of E. H. Tabor, of Bocking, Essex.

FAIRWEATHER—DUFFUS.—On Dec. 18th, at St. Nicholas Parish Church, Harpenden, Josiah William Chalmers Fairweather, M.B., to Helen Vera Mary Duffus, widow of James Logie Lyall Duffus.

DEATHS

BRAMHALL.—On Dec. 25th, in London, after a long illness, Lt.-Col. Charles Bramhall, R.A.M.C., retired, O.B.E., M.R.C.S. Eng., of Brook Meadow, Warsash, Hants.

BUTLER.—On Dec. 25th, at Belmont, Guildford, Harold Branson Butler, M.B.E., F.R.C.S., Edin., Consulting Surgeon to the Royal Surrey County Hospital, Guildford.

DAY.—On Dec. 20th, at Harleston, Norfolk, Donald Douglas Day, M.B. Lond., F.R.C.S. Eng., aged 79.

MCDOWELL.—On Dec. 23rd, at Mowbray, Cape Town, Laurence Fitzhenry McDowell, M.D. Dubl.

STARKEY-SMITH.—On Dec. 23rd, at Hungerford, Thomas Gordon Starkey-Smith, M.D. Lond., aged 57.

WARDROP.—On Dec. 25th, at Torbane, Camberley, Douglas Wardrop, C.B., C.V.O., M.B. Aberd., retired Colonel A.M.S.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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NOTES, COMMENTS, AND ABSTRACTS

THE SOCIAL CARE OF THE EPILEPTIC *

By RALPH H. CROWLEY, M.D., F.R.C.P. Lond.
LATE SENIOR MEDICAL OFFICER TO THE BOARD OF EDUCATION

HE would be a bold man who claimed he had ever cured a case of so-called idiopathic epilepsy in its well-established form. He may claim to have controlled the number and severity of the fits with commensurate relief to the patient. Nevertheless I know by long experience how depressing can be the critical survey of the results of treatment of children in residential schools for epileptic children. And there is evidence that were we to follow up the adolescents when they leave school the results would depress us still more. Dr. Tylor Fox's experience at Lingfield Colony has made clear the waste that ensues from the failure to follow up effectually the children leaving the colony school to take up life at home. Equally unsatisfactory is the lot of the large proportion of children for whom provision is not available at any such colony. But while it was likely that the disabilities from which both these classes of children suffered would increase rather than diminish as the child passed into later adolescent and adult life, little accurate knowledge has been available about the life of the epileptic in the community and the difficulties encountered by him and his family at home. There seemed then to be a definite need for a small-scale inquiry into this social aspect of epilepsy and for the working out of a practical scheme of help for the epileptic. The Central Association for Mental Welfare, with whose work I am closely associated, agreed to carry out such an inquiry.

A SAMPLE CENSUS

Accordingly in the summer of 1936, under the expert guidance of Dr. Tylor Fox, a preliminary inquiry was instituted in Essex in the districts of Barking, Romford, Leyton, Walthamstow, and Dagenham. The population of this area was 475,979. The names of 565 cases were received from the local authorities, hospitals and institutions, and from private individuals. From the records available the mental and social status of each patient was determined as far as practicable, and 57 patients were selected for home visits. The incidence of epilepsy in the area as shown by this inquiry was 1·2 per thousand, but it is probable that if the figures from the London Hospital could have been included some 250 cases would have been added and the incidence raised to about 1·8 per thousand. A rough classification of the cases was made into "sane," "unstable," and "mentally defective." The term "sane," though open to objection, was retained as it has an accepted meaning when applied to epileptics. The figures for epileptics of normal intelligence are probably too high, as the high-grade feeble-minded epileptic tends to be undetected in a busy out-patient clinic. The "unstable" group included those with well-marked manifestations of temperament peculiar to epileptics, and those who had been admitted to mental hospitals. No information was obtained in 155 cases of the 565. Of the remaining 410, 234 were classified as "sane," 45 as "unstable," and 131 as "mentally defective."

The inquiry was later extended to Tottenham and Wood Green and, as circumstances were particularly favourable, to Ipswich. In Ipswich the help of a large proportion of the practitioners in the borough was obtained through the local secretary of the British Medical Association, and this brought to light a much larger number of epileptics than in the previous areas. The total number reported was 225 out of a population of about 92,000, giving an incidence of 2·44 per thousand. Of the 225 cases, 162 were non-institutional and 63 institutional; 32 were 50 years of age or over; 145 were between 16 and 50 years; and 48 were under 16 years. Among the 162 non-institutional cases, 99 were reported sane, 30 unstable or deteriorating, and 19 mentally defective. The mental condition of 14 patients was unrecorded. Among the 63 institutional cases the corresponding numbers were 7 sane, 24 unstable or deteriorating, and 22 mentally defective. In addition 10 were reported as insane.

HOME VISITS

From the reports received on the visits to patients' homes it was evident that the young epileptic was often a great burden upon the mother, and parents were thankful to discuss their problems with someone who could advise them. Many were found to be worrying about the future of their children. The mothers tended either to keep their children in cotton-wool or to allow them to run serious risks. The post of errand boy on a bicycle was considered a desirable one by some mothers, and one allowed her son to become a painter with the result that he fell 20 ft. through a window. Another mother, on the other hand, would not let her son leave the house alone although he had only two or three fits a month. It was evident that friendly advice and assistance in placing children in suitable occupations would be very welcome. An opportunity for mothers to recount their worries, some suggestions for surmounting their difficulties, and the feeling that disinterested advice is available in a crisis, all help to mitigate the burden of solitary and unending responsibility. Normally a mother has little chance of a respite, and both she and her child suffer from being debarred from convalescent and holiday homes.

Careful inquiry was made on the question of employment. It was found that in Essex and to a less extent in Ipswich, the majority of adult epileptics were unemployed and bitterly resentful of the fact. The most pitiable cases were those men, apparently of normal intelligence and with no obvious signs of degeneration, who were unable to get work either because their doctors had forbidden it, although they were told to occupy themselves, or because their epilepsy was known and employers were frightened of it. The unemployed were mainly men, as female epileptics, even when unmarried, have household duties, and there are more safe and sedentary occupations open to them. But life is seldom easy for either sex, and most of the adult patients seemed to be suffering from a sense of isolation, hopelessness, and depression almost to the point of despair. Some remarked that they had fewer fits when they had work to occupy their minds. Moreover forced inaction makes them more difficult, and the corresponding increase in fits produces a greater strain on all concerned. It is indeed a vicious circle.

A PROBLEM IN MENTAL HEALTH

The inquiry showed most clearly that treatment of the epileptic, apart from the control of fits, is a

* Abstract of a paper read at the annual meeting of the International League against Epilepsy (British Branch) on Oct. 22nd, 1937.

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matter of attending to the mental health both of the patient and of his family. A full recognition of this would profoundly modify our present methods. The doctor, whether as private practitioner or hospital out-patient physician, has but a limited knowledge of the social and industrial circumstances of his patients, and few opportunities of exploring their symptoms of mental ill health and maladjustments. The epileptic needs all the advantages that the psychiatric clinic is bringing to the psychoneurotic, together with the assistance in the home that the mental welfare worker can render. The hospital doctor requires the help of the mental welfare worker as surely as the medical officer of health and the school medical officer require that of the health visitor and the school nurse. The hospital doctor, the private practitioner, the mental welfare worker, and the after-care visitor acting as a team and backed by the community could bring untold relief to the daily lot of the epileptic. Such a welfare organisation must operate early if it is to prevent the maladjustments of adult epileptics, for some 80 per cent. of cases have their origin in childhood and adolescence, and mental disabilities which begin then often steadily increase through adult life. On these lines we might hope to do for the epileptic very much what has been done for the cripple and is being done for the child with rheumatism and early heart disease, and prevent much of the "crippling" due to epilepsy.

FOLLOWING UP

The Central Association for Mental Welfare intends to follow up the work thus begun. It may be advisable to extend the inquiry to other types of areas before formulating a general line of action, but in the meantime much will be learned by observing the progress of the patients and families already visited. As the immediate result of the inquiries so far undertaken the Association is considering:—

(*a*) The extension to young epileptics leaving residential schools and colonies of their present system of after-care, and the provision of advice to parents and guardians as to suitable employment and management.

(*b*) The exploration of facilities for training in crafts, and of the practicability of employment by firms which regularly employ home workers.

(*c*) The provision of accommodation for epileptics during holidays and convalescence.

(*d*) The question of special legislation to include epileptics in the categories of handicapped persons entitled to special care by the State, such as the blind obtain under the Blind Persons Act.

In regard to employment the Council of the Association has been coöperating with the council for the Promotion of Occupational Industries amongst the Physically Handicapped, which already has a number of centres and home teachers for craft training and employment. Warm support has been forthcoming from local authorities, hospitals, and others in the areas in which inquiries have been made, and it remains only to use the experience gained in these localities for the benefit of epileptics the country over.

I should wish in conclusion to pay tribute to the admirable way in which this work has been carried out by Miss Cullen and Miss Craggs, who were responsible both for the actual investigations and for drawing up the reports.

ST. MARY'S HOSPITAL.—Mr. E. W. Meyerstein has given £32,576 to this hospital, which is the price of the freehold of a site of about 10,500 square feet adjoining it in Praed-street. The site will be used for extensions to the hospital.

THE DIONNE QUINTUPLETS

THE Dionne quintuplets were born on May 28th, 1934, and are unique in having reached their present age as an unbroken set. They live close to the farm where they were born, in a self-contained wooden house on an estate of seven acres surrounded by a high metal fence. They are cared for by a staff consisting of two nurses, a teacher, three policemen, a housekeeper and two maids, and four honorary guardians appointed by the Crown attend to their business affairs and to the administration of the considerable income which they derive from motion and still picture contracts and from the endorsement of food products and so on. At birth their average weight was 2 lb. 11 oz. and their medical attendants, Drs. A. R. and W. A. Dafoe, report that at three years they had reached 30 lb. 8 oz.—rather above the normal weight for their age (*Canad. med. Ass. J.* 1937, 37, 415). In other ways their development has been satisfactory, though the eruption of their teeth has been slow and mentally they are slightly behind the average.

Until the age of five months they were given breast-milk with tomato juice, cod-liver oil and ferrous chloride; evaporated milk with Dextri-maltose and cereal were then substituted. Since they were a year old they have had a varied diet, and gastro-intestinal upsets and feeding difficulties generally have been absent. Although the public have been allowed to view them only through a glass screen and their attendants have worn masks and gowns, they have had occasional mild nasopharyngeal infections. Otherwise they have been healthy, and at three years their only defects were tonsillar hypertrophy and some trivial eye abnormalities.

MacArthur and Ford, quoted by Prof. W. E. Blatz (*Ibid*, p. 424), consider that these quintuplets were derived from a single ovum, for there appears to have been but one placenta and one chorion, and they show remarkable similarity in such characteristics as blood groups, finger-print patterns, facial appearance, hair and eye colour, and the possession of a mild degree of syndactyly. Despite their identical environment, however, conspicuous differences in their social behaviour and compliance with discipline have already appeared. The children are said to be less than usually quarrelsome, and so far there appear to have been no ill effects from the publicity in which they have been brought up.

GEODESY AND CILIARY ACTION

Snow Miller, in his recent book,[1] describes the arrangement of the smooth muscle in the walls of the bronchi and bronchioli as conforming to a "geodesic net-work." A geodesic line on any surface, by definition, is one which traverses the shortest distance between any two points on that surface. On a plane it is clearly a straight line, whereas in relation to a sphere or a cylinder, such as the bronchial wall, it is an arc of a circle and the interlacing of a series of such arcs will produce a geodesic net-work. Mathematically, a geodesic pattern is admirably suited for resisting stresses and strains and for producing an equally distributed pressure within the space enclosed.

Barclay, Franklin, and Macbeth,[2] of Oxford, while studying dust excretion from the lungs, observed, by chance, the tendency of the ciliated epithelium of the trachea to carry foreign particles upwards in the form of a spiral, the movement being clockwise when viewed from above. That this behaviour of the ciliated epithelium of the respiratory tract is not universally recognised is clear as two current text-books of physiology contain no mention of it. The authors pursued the question further by injecting indian ink into the lungs of dogs, sheep, and cats immersed in Ringer's fluid. They found that at the

[1] Miller, W. S., The Lung, London, 1937.
[2] Barclay, A. E., Franklin, K. Y., and Macbeth, R. G., *J. Physiol.* 1937, 90, 347.

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junction of the bronchioli to form bronchi and at the bifurcation of the trachea the movement of the cilia is such that the particles are directed to either side without actually invading the edge of the junction. In the trachea both streams adopt the clockwise spiral.

There would seem to be, therefore, in the trachea and bronchi a relationship between structure and function; for if the spiral pathways of numerous particles, each one starting upon its journey of extrusion from a different point in the bronchial tree, could be visualised they would be seen to make, by their intersections, a moving network closely akin to the geodesic pattern which Snow Miller, from his reconstruction models, claims for the smooth muscle of the bronchial wall.

REST IN BED

REFLECTING upon the remedial value of rest in bed, Prof. Adam Patrick wonders whether it may not sometimes be overdone (*Edinb. med. J.* December, 1937, p. 750). Pyrexia is an absolute indication for rest in bed and no admiration need be wasted on the hero who sticks to his post with a temperature of 104° F.; he should be put to bed at once, by force if necessary. But how long should he be kept there? Excessive rest is bad for the skeletal musculature, so rest in bed should be minimal. But what is the minimum? Dr. Patrick thinks that the spirit of the law is more important than the letter, and that in many pyrexial conditions small exertions such as rising to stool are beneficial rather than harmful. Moreover, the axillary temperature, which is appreciably lower than the oral, should be taken as the standard of normal or otherwise. Irrespective of physical signs in the chest, patients with uncomplicated lobar pneumonia may be allowed up 7 days after the crisis. In rheumatic fever the pulse-rate is more important than the temperature and in this condition Dr. Patrick thinks that rest in bed for 3–4 weeks in the case of adults and 6–8 weeks in the case of children is long enough unless the heart is affected. There are many who hold that, in children at any rate, the heart is always affected; Dr. Patrick, however, puts rheumatic carditis in a separate category altogether, and here he advocates rest in bed for anything from 6 to 18 months, which in all conscience should be long enough. Three weeks in bed is probably enough for uncomplicated scarlet fever, and 5 days, after fever has subsided, enough for measles; although the old rule for measles, "in bed till the rash has gone and indoors till the cough has gone," has much to commend it. The enteric group probably requires 3 weeks post-febrile confinement to bed, and diphtheria at least 3 weeks flat and a fourth week sitting up. Patients with myocardial degeneration, according to Dr. Patrick, may be allowed up in a chair for a little after a few weeks of complete rest; he does not hold, as many clinicians do, that they should often be nursed in a chair from the start. In acute nephritis his practice is to let the patient get up after 4 months if there is no œdema even if albuminuria persists. Of nervous diseases he shrewdly observes that upper motor neurone lesions such as disseminated sclerosis, are usually benefited by rest in bed, whereas those involving the posterior columns, such as tabes, are made worse. Hemiplegics should be got up as soon as possible after the "stroke," perhaps in a week or less, and even severe cases of Addisonian anæmia, with hæmoglobin as low as 30 per cent., are often better up. Subjects of chronic peptic ulcer often do well on a weekly day in bed—or (it may be added) a few days extra when there is exacerbation of symptoms such as commonly follows the sudden onset of cold weather. Speaking tentatively, as a physician must when discussing surgical matters, Dr. Patrick favours early post-operative movements and rising as a means of diminishing the risk of thrombosis and embolism. On the same grounds he disapproves of putting patients in the Fowler position after operation.

NEW PREPARATIONS

COW AND GATE (VITAMIN D) MALTED MILK.—This is a food drink prepared from milk and malted barley and wheat, with the addition of a cod-liver oil concentrate providing vitamin D. It is sold as a powder which may be mixed with milk or with water and drunk hot or cold. The makers (Cow and Gate Ltd., Guildford, Surrey) recommend their product as a supplementary food for children, invalids, and old people, as well as for athletes and others undergoing physical or nervous strain. It is attractive to children and easily assimilated, and is put forward as a suitable drink at bedtime for those who are wakeful.

ALLEN AND HANBURYS LTD. (Bethnal Green, London, E.2) have sent us a copy of their "Medical and Dietetic Products Price List" which replaces their former reference book "Medicamenta Recentia." The new volume contains descriptions of their various specialties, together with a list of sera and vaccines prepared at the Lister Institute and a therapeutic index. The illustrations include pictures of the original premises in Plough-court, Lombard-street, where the firm was founded in 1715, and portraits of some of the distinguished men who have directed it.

A calendar issued by J. F. MACFARLAN AND CO. (32, Bethnal Green-road, London), manufacturers of alkaloids, anæsthetics, and other chemicals, is illustrated with the portraits of the four men responsible for the firm's early growth from the business, founded in 1780, of an Edinburgh surgeon-apothecary. Macfarlan himself was a doctor, being president and then treasurer for 30 years of the Royal Medical Society, as well as an original member of the Pharmaceutical Society. He was helped from the technical side by David Rennie Brown and his son. The former is said to have been the first to produce morphine on a commercial scale in this country. The son, also an expert on the constituents of opium, collaborated with Lister in manufacturing his antiseptic dressings and ligatures.

AN ARTICLE WANTED

THE following letter reaches us from the editor of *Health from Herbs* (1, Ashford-road, Hastings): "It is proposed to open our columns this year to the various systems of medicine other than Herbal Medication, for the purpose of stating their case in favour of their particular system. I, therefore, write to ask whether you would care to supply me with an authoritative article in support of the Allopathic system, or, alternatively, to supply me with the name and address of someone else whom I could approach. The article should not exceed 1000 words and should briefly and plainly set forth the principles of your system, its advantages and (if you desire) disadvantages as compared with other systems; remembering that the article is to be written for the public and not for the profession."

CORRIGENDA

ASSESSMENT OF PSYCHIATRIC TREATMENT.—In Dr. Goodman Levy's letter in our last issue the sentence "it would be irrational to test a minor measure in the first instance" should read "it would be *rational*," &c.

AMINO-ACIDS IN MILK.—In the first sentence of our annotation on this subject (Dec. 25th) the word "diluted" should be "undiluted."

GIFTS FOR LONDON HOSPITALS.—The Hospital Saving Association has distributed £114,000 among 120 hospitals in the London area as a special Christmas gift. Hospitals which benefited include the London Hospital (£7786), King's College Hospital (£2439), Charing Cross Hospital (£2020), Middlesex Hospital (£3528), Guy's Hospital (£4625), and St. Bartholomew's Hospital (£5247).

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Vacancies

For further information refer to the advertisement columns

Birmingham, Children's Hosp.—Receiving Room Officer, £250. Res. Sen. Cas. H.S., £125. Also First Asst. to Orthopædic Dept., £100.

Birmingham and Midland Eye Hosp.—H.S., at rate of £130. Also Surg. Reg.

Bolingbroke Hosp., Wandsworth Common, S.W.—H.P., at rate of £120.

Bradford, Royal Eye and Ear Hosp.—H.S., £180.

Brighton, Royal Sussex County Hosp.—Cas. H.S., £120.

Bristol Royal Infirmary.—Sen. Cas. H.S. and Sen. Obstet. H.S., at rate of £150 and £100 respectively. Also H.P.'s and H.S.'s, each at rate of £80.

Calcutta, All-India Institute of Hygiene and Public Health.—Prof. of Maternity and Child Welfare, Rs. 450.

Canterbury, Kent and Canterbury Hosp.—H.S. to Spec. Depts., at rate of £125.

Chester City and County.—Deputy M.O.H. and Deputy School M.O., £600.

Cheyne Hosp. for Children, Chelsea, S.W.—Hon. Aural Surgeon to In-patients.

Colchester, Severalls Mental Hosp.—Asst. M.O., £510.

Croydon General Hosp.—Hon. Asst. Physician.

Deal, Victoria Hosp.—Res. M.O., at rate of £150.

Devonport, Prince of Wales's Hosp.—Jun. H.S., at rate of £120.

Doncaster Royal Infirmary.—H.S., at rate of £175.

Durham County Hosp.—H.S., at rate of £150.

Ealing, King Edward Memorial Hosp.—Cas. O. and Deputy Res. M.O., at rate of £225.

East Ham Memorial Hosp., Shrewsbury-road, E.—Res. M.O., at rate of £200.

Elizabeth Garrett Anderson Hosp., Euston-road, N.W.—Hon. First Asst. and Clin. Asst. for Ophth. Clinic.

Epsom, Surrey County Hosp.—Res. Asst. M.O., at rate of £375.

Guildford, Royal Surrey County Hosp.—H.S., at rate of £150.

Guildford, Warren-road Hosp.—Med. Supt., £800.

Hampstead General and N.W. London Hosp., Haverstock Hill, N.W.—H.P., at rate of £100.

Hosp. for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. Also H.P. for Frimley Sanatorium, each at rate of £50.

Hospital for Tropical Diseases, Gordon-street, W.C.—H.P., at rate of £120.

Hosp. of St. John and St. Elizabeth, 60, Grove End-road, N.W.—Res. H.P., at rate of £100.

Ilford, King George Hosp.—Cas. O. and Surg. Reg., £150.

Infants Hosp., Vincent-square, Westminster, S.W.—Res. M.O., £300.

Kidderminster and District General Hosp.—Jun. H.S., £100.

Leeds, Killingbeck Sanatorium.—Sen. Asst. Res. M.O., £425.

Leicester City Isolation Hosp.—Res. M.O., at rate of £300.

Leicester, City Mental Hospital, Humberstone.—A.M.O., £350.

Lincoln County Hosp.—Sen. H.S., at rate of £250.

Liverpool, Fazakerley Sanatorium.—Res. Asst. M.O., £250.

Liverpool, Royal Children's Hosp.—Res. M.O. and Res. Surg. O. for Heswall Branch, each at rate of £120. Also two Res. H.P.'s and two Res. H.S.'s for City Branch, each at rate of £100.

Liverpool School of Tropical Medicine.—Asst. Lecturer in Dept. of Entomology, £400.

Liverpool University.—George Holt Chair of Pathology, £1200.

London Hosp., E.—Surgical First Asst. and Reg., £300.

London Jewish Hosp., Stepney Green, E.—Surg. Reg., 60 guineas.

London University.—University Chair of Surgery at University College Medical School, £2000. Also University Readership in Medical Parasitology at London School of Hygiene, £900.

Manchester, Booth Hall for Children.—Res. Asst. M.O., at rate of £200.

Manchester, Crumpsall Hosp.—Res. Asst. M.O., at rate of £200.

Morecambe and Heysham Borough.—M.O.H., £800.

Morley Borough.—Asst. M.O.H. and Asst. School M.O., £500.

National Temperance Hosp., Hampstead-road, N.W.—Hon. Anæsthetist. Also Med. Reg., 40 gns.

Norwich, Norfolk, and Norwich Hosp.—H.S. to Special Depts. Also General H.S., at rate of £160 and £120 respectively.

Peterborough and District Memorial Hosp.—Pathologist, £500.

Plymouth, Prince of Wales's Hosp., Greenbank-road.—H.S., at rate of £120.

Prince of Wales's General Hosp., N.—Hon. Clin. Asst. to Children's Dept.

Princess Louise Kensington Hosp. for Children, St. Quintin-avenue, W.—Clin. Asst. for Out-patient Dept.

Reading, Royal Berkshire Hosp.—Cas. O., at rate of £150.

Rochester, St. Bartholomew's Hosp.—Cas. O., at rate of £150.

Royal Air Force.—Temporary Civilian Dental Surgeons.

Royal Cancer Hosp., Fulham-road, S.W.—Res. M.O., £200.

Royal Free Hosp., Gray's Inn-road, W.C.—Registrar to Ear, Nose and Throat Dept.

Royal London Ophthalmic Hosp., City-road, E.C.—Registrar, £200.

Royal Naval Dental Service.—Dental Officers.

Royal Naval Medical Service.—M.O.'s.

St. Albans, Hill End Hosp. and Clinic, &c.—Asst. Med. Director, £500.

St. Bartholomew's Hosp., E.C.—Whole-time Chief Asst. in X-Ray Diagnostic Dept., at rate of £400–£500.

St. Marylebone and Western General Dispensary, 48, Cosway-street, N.W.—Hon. M.O. of Infant Consultations and Children's Dept.

St. Thomas's Hosp., S.E.—Asst. Physician to Dept. of Psychological Medicine.

Salford Royal Hosp.—H.S., at rate of £125.

Sheffield Royal Infirmary.—Sen. Cas. O., at rate of £150.

Stafford, Coton Hill Mental Hosp.—Asst. M.O., £400.

Sunderland Royal Infirmary.—Jun. H.S., £120.

Victoria Hosp. for Children, Tite-street, Chelsea, S.W.—Ophth. Surgeon, H.P. and H.S., each at rate of £100. Also Out-patient Anæsthetist, 10*s.* 6*d.* per attendance.

Walsall Manor Hosp.—Asst. M.O., £350.

Warwickshire and Coventry Mental Hosp., Hallon.—Temp. M.O., £350.

West Bromwich, Hallam Hosp.—H.P., at rate of £200.

West End Hosp. for Nervous Diseases, 73, Welbeck-street, W.—Hon. Med. Psychologists. Two Res. H.P.'s, each £125. Also Registrar to Out-patient Dept., £200.

West Ham Mental Hosp., Goodmayes.—Two Jun. Asst. M.O.'s, each £350.

West London Hosp., Hammersmith-road, W.—Hon. Ophth. Surg.

Wolverhampton and Midland Counties Eye Infirmary.—H.S., £150.

Worthing Hosp.—H.S., at rate of £130.

Medical Diary

January 3rd to January 8th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY.

Orthopædics. 5.30 P.M. (Cases at 4.30 P.M.)

Mr. D. McCrae Aitken: 1. Fragilitas Ossium. 2. Dystrophy of Bone. Mr. E. P. Brockman: 3. Fracture of Ankle with Spina Bifida. 4. Myositis Ossificans of Adductors. 5. Traumatic Periostitis of the Tibia. 6. Report on Pathological Fracture of Humerus. Mr. C. Lambrinudi: 7. Metatarsus Elevatus. Miss E. H. Jebens: 8. Pellegrini-Stieda Disease. Mr. Norman Capener: 9. Ossification in the Quadriceps Muscle following Injury. 10. Fracture Dislocation of the Ankle. 11. Giant Cell Tumour, Upper End of Tibia: X Rays, to report progress. 12. Giant Cell Tumour at Lower End of Femur. 13. Subperiosteal Incarceration of Fractured Capitellum.

WEDNESDAY.

Surgery. 8.30 P.M.

Mr. James F. Philip: The Circulation in Gangrene of the Lower Extremities. Dr. Paul Wood: The Question of Cardiac Complications in Major Abdominal Surgery. Dr. R. W. B. Ellis will show a film on Blood Transfusion at the Front by Dr. Frederic Duran-Jordá.

KENSINGTON MEDICAL SOCIETY.

WEDNESDAY.—8.30 P.M. (St. Mary Abbots Hospital, Marloes-road, W.), discussion on Gastro-enteritis in Children.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

FRIDAY.—8.30 P.M. (De Vere Hotel), Mr. Eardley Holland, Mr. Kenneth Walker, Prof. V. B. Green-Armytage, and Mr. F. J. McCann: Sterility.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.

TUESDAY.—4.30 P.M., Prof. Arthur Ellis: Nephritis.

WEDNESDAY.—Noon, clinical and pathological conference (medical). 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Dr. Cuthbert Dukes: Surgical Pathology of Diseases of the Rectum.

THURSDAY.—2.15 P.M., Dr. Duncan White: Radiological Demonstration. 3.30 P.M., Mr. Leslie Williams: Disproportion and Difficult Labour.

FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. C. Naunton Morgan: Diseases of the Rectum.

Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.

TUESDAY.—5 P.M., Dr. A. C. Roxburgh: Syphilis.

THURSDAY.—5 P.M., Dr. J. M. H. MacLeod: Ringworm Infections. (Chesterfield lectures.)

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

FRIDAY.—4 P.M., Mr. N. Asherson: Pyrexia of Ear, Nose, and Throat Origin.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY to SATURDAY.—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in dermatology (open to non-members).—WEST END HOSPITAL FOR NERVOUS DISEASES, Welbeck-street, W., 8.30 P.M., demonstration on fundus oculi.—PRESTON HALL, near Maidstone, Kent, Sat., demonstration on pulmonary tuberculosis.—Unless otherwise stated, courses are open only to members.

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ADDRESSES AND ORIGINAL ARTICLES

NUTRITION AND NUTRITIONAL DISEASES *

By LEONARD G. PARSONS, M.D., F.R.C.P. Lond.

PROFESSOR OF DISEASES OF CHILDREN IN THE UNIVERSITY OF BIRMINGHAM; PHYSICIAN TO THE CHILDREN'S AND GENERAL HOSPITALS, BIRMINGHAM

I

SINCE my co-lecturers have dealt with the chemistry of the carbohydrates (Prof. W. N. Haworth) and the fat-soluble vitamins (Prof. J. C. Drummond), I shall confine the greater part of my remarks, as far as the vitamins are concerned, to vitamin C. Indeed, Lecture II will be devoted to a discussion of the rôle of this vitamin in disease. Throughout both lectures I shall illustrate much of what I have to say by reference to investigations carried out at the Children's Hospital.

General Nutrition

A distinguished American pædiatrician has thus expressed the difficulty of associating clinical symptoms in man with a specific deficiency in the diet and of correlating deficiency diseases in animals with disease in man (Weech 1930):—

"The exact methods of the laboratory are not obtainable with observations on human disease. The diet of the experimental animal is chosen with meticulous care; that of the human being is dictated by geographic location, class or racial custom, individual appetite and the exigencies of economy. A diet so limited as to be deficient in one essential is liable to be defective in several."

This explains why nutritional diseases in childhood not infrequently occur in combination—e.g., rickets and scurvy, rickets and deficiency anæmia.

INFLUENCE OF ENVIRONMENT

A diet sufficient to prevent clinical signs of disease under certain conditions may be unable to do so under others; thus, one that may prevent pellagra may be rendered pellagrous by the occurrence of diarrhœa, and a diet which will prevent rickets in a negro infant living in equatorial Africa is quite unable to do so in England.

This influence of surroundings is well seen in experiments which my colleagues and I carried out over a period of three years.

In the first year (1933) three groups of rats were placed on a rickets-producing diet, one being kept in the dark, another exposed daily from 11 A.M. to 1 P.M. (G.M.T.) to the open sky but not to direct sunshine, and the third exposed for the same time to whatever direct sunshine was available. This was done for four weeks, two hours being chosen for exposure because it is about the time the average baby spends out of doors. From experiments at Toronto and elsewhere it is known that healing should begin when the sun is about 35° above the horizon, and this occurs in Birmingham for a little more than six months (say 28 weeks), in Glasgow for six months, in London for seven, and in Toronto for eight months of the year. Actually, healing only occurred in the sunshine rats from June 7th to Oct. 3rd (a period of 17 weeks), and in skyshine rats from July 24th to Sept. 26th (9 weeks).

The summer of 1933 was very sunny, and this restricted period of healing was thought to be due to the smoke pall over Birmingham. The experiment was therefore repeated in 1934, when another series of rats was exposed in the open country at the Infants' Hospital, Canwell, on the north-east side of Birmingham; curiously enough healing here was not so good as in Birmingham. Therefore last summer three series of rats were used, one on the south-west side of Birmingham on the Lickey Hills, one in Birmingham, and one at Canwell. The results show that healing is very slightly better at the Lickey than in Birmingham and considerably better in Birmingham than at Canwell.

It is clear therefore, first, that a diet that will produce rickets if the animal is kept indoors will not do so at certain times in the year if a degree of sun- or sky-shine is available; and, secondly, that the same diet is more efficacious in preventing rickets in the country south-west of Birmingham than in that to the north-east, provided that a certain time is spent out of doors. The only explanation that one can suggest for this is that the prevalent south-west winds carry the smoke from Birmingham and the Black Country to the north-east of Birmingham, and that this cuts off many of the curative ultra-violet rays.

Diet, the problems of general nutrition, and the existence of malnutrition have now become stock items of newspaper news, advertisements, and political debates. We constantly hear and see statements such as "40 per cent. of the nation is undernourished," and "starvation in a land of plenty," Malnutrition is quite easily recognised by Members of Parliament and publicists, but clinicians find it difficult to diagnose particularly in mild degrees. The state of nutrition depends not only on an adequately balanced and properly cooked supply of food but on such factors as the surroundings, geographical location and stature of the individual, monotony, fresh air, light, sunshine, cleanliness, exercise, worry, sleep, and the presence of disease. Some also require more of certain articles of diet than others; for instance, some infants and adults need large amounts of iron to prevent an iron-deficiency anæmia. Again, I have seen a child with rickets who required ten times the normal dose of vitamin D to produce a cure and to prevent recurrence, and I have seen a baby develop scurvy after taking 1–2 oz. of orange juice daily for months.

Cathcart (1937) defines good nutrition as "the state of well-being which characterises the individual who is physically and psychologically sound," and thinks that if it is desired to limit the conception of nutrition to the effect of food it would be better to substitute for it the word "alimentation." An individual may be well fed and yet be badly nourished, since for good nutrition it is essential that the diet supplied should be adequate in all respects, that it should be normally absorbed from the intestine, and that the body should be able to utilise it after absorption. The importance of the first factor is self-evident; as to the second, the effects of defective absorption reach their climax in cœliac disease, in which the sufferer, even on a diet that everyone would pass as completely adequate, may develop a whole series of deficiency diseases—e.g., rickets, tetany, cataract, xerophthalmia, scurvy, beri-beri, dermatitis, microcytic and macrocytic anæmia. Under this heading may possibly be classed those who seem to require larger amounts than the normal person of such dietary constituents as iron and the various vitamins. With regard to the third factor, defective utilisation is seen in such widely different diseases as diabetes, von Gierke's disease, the lipoidoses, cystinuria, alkaptonuria, pentosuria, congenital porphyrinuria, and

* Withering lectures (abridged) delivered before the University of Birmingham on May 11th and 13th, 1937.

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achrestic anæmia, all of which can strictly be regarded as nutritional diseases.

ABSENCE OF STANDARDS

One of the great difficulties in discussing nutrition is the absence of any definite standards. Deficiency diseases are accepted as definite evidence of malnutrition, yet it is common clinical experience that most infants with scurvy seem to be well nourished and well developed An even more contradictory state of affairs sometimes occurs in rickets; for the development of this disease growth is an absolute essential, and hence the over-fed infant who grows rapidly develops it. Are we therefore to accept overfeeding as evidence of malnutrition? The usual standards of nutrition are based upon height, weight, vital capacity, dynamometer tests, hæmoglobin estimations, &c., but these, although useful, are all unsatisfactory. For instance, "according to the Royal Air Force Central Medical Board, every member of the 1933 Everest expedition with one exception was under average weight, and this exception was taken seriously ill" (Smythe 1935). Growth may be impaired if the diet is inadequate, but, as Cathcart pointed out, stature is usually an inherited characteristic. Murk Jansen (1921) maintained that tallness was often the expression of "feebleness of growth," and that the outstandingly tall person in the family was the feeble one. Again, growth during an illness that entails some weeks in bed is often remarkable. Growth occurs particularly during the first two years, from five to seven years, and at puberty, and, although it may perhaps be accelerated during these periods by diet or over-feeding, the final adult stature does not appear to be increased. Over-feeding is more likely to lead to increased weight than to increased growth, and I believe the question asked two thousand years ago comes near to the truth: "Which of you by taking thought can add one cubit unto his stature?"

Is there any clinical evidence of malnutrition apart from clear-cut deficiency diseases? Every clinician has his own standard—in reality only an impression—which varies from year to year. I have formed the impression that there is much less malnutrition than there was 25 years ago. Scurvy is certainly far less common, and severe rickets is now rarely seen. Malnutrition, however, does exist, and although many public-school boys and their parents regard the school diets as grossly inadequate, the children of this class show less than those attending elementary schools in depressed areas.

It has been suggested that the fall in the death-rate that has taken place within recent years is evidence against the existence of malnutrition, but the deduction is hardly justified as so many other factors must have influenced the decline—for instance the triumphs of preventive medicine and such clinical triumphs as the insulin treatment of diabetes and liver treatment of pernicious anæmia.

These are a few of the reasons why I find it difficult to have any standards of nutrition and malnutrition, nevertheless our knowledge of nutrition and nutritional diseases is becoming greater every day, although it is sometimes impossible to see the clinical applications of many of the discoveries. Every now and again, however, some master hand like Prof. Drummond takes the pieces of this jig-saw puzzle and fits them together into a perfect picture. This is the age of vitamins, and even in the age itself there are certain cycles. We have been living in a period of A and D, but recently pride of place has been usurped by C, and there are signs that C in its turn will ultimately give place to B.

Diseases of the Erythron

Some idea of the complexity of the problem of nutrition may be obtained by a study of the nutrition and nutritional diseases of a single cell, and as an example we may take the red blood-cell—surely in structure the simplest cell in the body, being only an envelope with a stroma containing a solution of hæmoglobin in its interstices—yet, just because it does contain hæmoglobin, one of the most complex in its nutrition, and subject to striking nutritional diseases.

The red blood-cell arises from the endothelial cells of the intersinusoidal capillaries which connect the large sinuses of the bone-marrow. In these capillaries circulation is practically stagnant and the red cells which are budded off pass through various stages until they are mature, when they become separated from one another by plasma trickling between them, the capillary opens, and they are swept into the general circulation. Any call for large numbers of red blood-cells such as occurs in anoxæmia due to living in high altitudes, from severe hæmolysis in acute hæmolytic anæmia, severe hæmorrhage, and congenital heart disease, stimulates the capillary and sinus circulation and large numbers of cells—many of them immature—are discharged into the circulation.

Anoxæmia thus affects the red blood-cell in two ways: first, local anoxæmia in the capillaries is almost certainly the factor which causes the endothelial cells of the capillaries to bud off the primitive red cell; secondly, general anoxæmia causes the cell factory to discharge its products, perhaps before their due time, into the circulation.

The intermediate stages through which the red cell passes from the endothelial cell to the erythrocyte can be recognised and have been designated as megaloblast, macronormoblast, normoblast, and reticulocyte. With each successive change the cell becomes smaller and finally loses its nucleus when the normoblast becomes the reticulocyte. The stroma is probably built up in the megaloblast stage, the hæmoglobin being added later. The vast majority of cells normally in the circulation are derived from the normoblast stage, because one megaloblast will give rise to a large number of normoblasts, which in their turn may multiply indefinitely. To ensure that this maturation takes place and to enable the nucleus to elaborate hæmoglobin, certain substances in addition to oxygen have to be supplied to the bone-marrow. Thus, to ensure maturation from the megaloblast to the normoblast the "hæmatinic factor" produced by the interaction of an extrinsic factor present in the food with an intrinsic factor in the gastric juice is necessary, and in its absence maturation is held up at the megaloblast level and a megalocytic hyperchromic anæmia develops. For the maturation of the normoblast to the erythrocyte it is usually stated that iron, copper, and possibly some other metals, vitamin C, and thyroxin are required, and that a microcytic hypochromic anæmia develops if these are not supplied, but from our observations it is clear that this statement requires modification and extension. It is our view that, except for the congenital microcytosis of acholuric jaundice and of sickle-cell anæmia, any obvious degree of microcytosis always indicates a deficiency of hæmoglobin. This lack of hæmoglobin also is essentially due to iron deficiency, although it may be caused by the absence of certain food substances containing the pyrrol ring, and possibly also calcium, copper (at any rate experimentally), and perhaps some other metals that act as mobilisers or

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catalysts of iron. Further, we believe that anoxæmia, ascorbic acid, and thyroxin act throughout the whole range of maturation from reticulo-endothelial cell to erythrocyte.

Hæmoglobin is an iron porphyrin, its analogue, chlorophyll, being a magnesium porphyrin. The porphyrins are made up of a number of five-carbon-atom rings—the pyrrol ring—and opinions vary as to whether the pyrrol ring can or cannot be synthesised in the body. Some cases of deficiency anæmia are due to pyrrol deficiency, and there is some indirect evidence from the life of the red blood-cell that the body has a mechanism designed to avoid undue loss of the pyrrol ring nucleus. Both of these considerations suggest that the pyrrol nucleus is not synthesised in the body, or at any rate not in sufficient amounts for the body needs. The life of the red blood-cell after its discharge into the circulation has been variously estimated as from three weeks (or less) to three months, and ultimately it is either broken up in the blood stream and engulfed by the scavenger cells of the reticulo-endothelial system, or captured alive and devoured by these cells. In either case it achieves a degree of immortality, for these same reticulo-endothelial cells lay hold on its hæmoglobin, separate the iron from it, and leave the pyrrol compound bilirubin, both of which substances are used for the equipment with hæmoglobin of generations of red cells as yet unborn. The iron and bilirubin are transported to the liver where the iron is stored as hæmosiderin, and the bilirubin excreted as bile pigment. Some of the latter is, however, reabsorbed into the circulation, thus conserving some of the body's pyrrol ring compounds for use in hæmoglobin building. Incidentally it is now claimed that the stores of iron in the liver of the new-born infant are not very large, and that the greatest store of iron at birth is in the blood, but it is the hæmolysis occurring after birth that furnishes the store of iron necessary for the formation of red blood-cells during the lactation period.

I will now deal with the effects of a deficient supply of some of the factors other than the "hæmatinic factor" required for the nutrition of the erythron.

IRON DEFICIENCY

I have stated that an obvious microcytosis and a low colour-index mean essentially a deficiency of iron in the body. This microcytosis apparently occurs so that the available hæmoglobin shall be used to the greatest advantage, since, if this is distributed in small cells, a greater total surface of hæmoglobin is presented to the blood stream and therefore its oxidation functions can be carried out better than with cells of normal size.

We have devised a diet for rats which, although somewhat deficient in iron, is complete in other respects and contains enough iron to prevent any lowering of the hæmoglobin. Rats fed on this diet have a normal amount of hæmoglobin, but show polycythæmia and microcytosis, and when given adequate amounts of iron their red cells become normal in size and number. This indicates that the first signs of an iron-deficiency anæmia are polycythæmia and microcytosis. The next stage in the development of anæmia is, of course, a reduction in the hæmoglobin, followed later by a smaller reduction in the number of cells. This phenomenon in the rat is occasionally paralleled in children receiving iron treatment for nutritional anæmia. In these shortly before complete cure is achieved the red cells may be found to be about 6,000,000 per c.mm., although the hæmoglobin is still below normal, but when the latter reaches normal figures the red cell count also becomes normal. The progeny of rats fed on this defective diet develop a microcytic hypochromic anæmia shortly after birth, which, in its turn, can also be cured by the adequate administration of iron, thus showing that the nutrition of the mother affects the nutrition of the erythron of her fœtus. Some workers on anæmia say that results obtained in rats are not evidence of what will occur in the human fœtus and child, because the rats are not in normal surroundings but in captivity—a remark that would apply to many mothers and babies amongst the poorer classes—and because the rat increases in weight much more rapidly than the normal baby. The babe, however, as well as the rat, increases threefold in a similar comparable period—e.g., from birth to the end of the lactation period. Moreover, the results obtained with rats in nutritional anæmia can be paralleled so often with those obtained in the human being that any results in the rat must be scrutinised very carefully before they are rejected. Further, if certain methods produce specific results in the rat that are identical with those in the child, the inference that the same process is at work is difficult to refute. We know that hypochromic anæmia occurs in pregnant women as a consequence of the persistence of a pre-existing anæmia, or when inadequate amounts of iron are absorbed from the alimentary tract, owing to a restricted dietary or gastric anacidity, and that in the last three months of pregnancy the "development of blood in the fœtus creates 'blood loss' for the mother no less real than if the contents of the fetal circulation had escaped from the mother through an external hæmorrhage" (Castle and Minot 1936). It is surely reasonable to assume, therefore, that at times the fœtus may suffer, and that when nutritional anæmia develops abnormally early in the baby, it is due to iron deficiency in the mother as in the rat experiments I have described.

The effect of an adequate iron intake on the mother's blood before and after delivery was shown by R. J. Gittins (Smallwood 1936).

The hæmoglobin of two groups of women was estimated during pregnancy and after delivery and the hæmoglobin values of their infants were followed for the first six months of life. To one group of 59 women, gr. 45 of iron and ammonium citrate were given daily for from one to three months before delivery, the other group of 106 women not receiving any iron. The hæmoglobin values of a control group of non-pregnant women in the same social class were also estimated.

The results showed three things:—

(1) The prevalence of iron-deficiency states resulting in the development of hypochromic anæmia of pregnancy, which continued to a lesser degree after delivery; (2) the value of adequate doses of iron in preventing that anæmia; (3) infants born to the group of mothers that were given iron had a definitely higher hæmoglobin at each age-period than those born to the mothers who had none.

Both experimental and clinical observations, therefore, indicate: that a deficient supply of iron to the bone-marrow first produces microcytosis and polycythæmia, and if the supply is still more deficient a hypochromic microcytic anæmia; that an inadequate supply of iron during pregnancy may lead to hypochromic anæmia of the mother and the birth of a child who becomes anæmic shortly after birth; and, finally, that the administration of an adequate supply of iron to expectant mothers will prevent or cure the hypochromic anæmia of pregnancy, and that the babies born of such mothers will, throughout

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infancy, show higher hæmoglobin values than those born of mothers suffering from hypochromic anæmia.

UTILISATION OF IRON

Castle and Minot (1936) maintain that iron and the liver factor in their respective types of anæmia represent true replacements of some deficiency because they are only of value in their own type of anæmia, and never lead to over-production and a polycythæmia vera.

In dogs made anæmic by repeated bleeding, Whipple and Robscheit-Robbins (1936) found that iron given intravenously was accounted for quantitatively by the amount of hæmoglobin formed; for instance, 10 mg. of iron produced 3 g. of hæmoglobin the iron content of which is 10 mg.—a true replacement of an existing deficiency. On the other hand when iron was given by mouth the optimal dose showed only 35 per cent. utilisation, and with very large doses only 5 per cent. was utilised in the formation of hæmoglobin.

Much the same results have been obtained in man, thus Heath, Strauss, and Castle (1932) treated a number of adults suffering from hypochromic anæmia by injections of iron and also found that 10 mg. of iron produced 3 g. of hæmoglobin—or a rise of 1 per cent. in hæmoglobin only required the addition to the circulation of gr. $\frac{1}{8}$ of metallic iron. In hypochromic anæmia treated with large doses of iron the hæmoglobin increases from 1 to 2 per cent. per day. Assuming the increase to be 2 per cent., only gr. $\frac{1}{8}$ of iron are required each day, yet gr. 90 of iron and ammonium citrate—the amount usually administered daily—contain gr. 30 of iron.

Why is it necessary, then, to give large doses of iron? Brock and Hunter (1937) have demonstrated that these large amounts are well absorbed but that there is a big discrepancy between retention and utilisation. Brock (1937) concludes that the administration of an excess of iron leading to a great accumulation in the tissues may be more effective in certain cases of hypochromic anæmia than the much smaller doses that would be enough for actual hæmoglobin formation. He suggests two possible reasons for this: first, that the presence of some potentiator such as copper is necessary, which is not present in all iron preparations or possibly present in insufficient quantity; secondly, that large amounts of iron present in the intestine may by altering the chemical environment aid the absorption of other substances necessary for hæmopoiesis in iron-resistant individuals. There is, however, a third possibility that the ingested iron is stored in the liver and requires some other substance than copper to mobilise it for use in hæmoglobin building.

Although the hæmoglobin of infants during the lactation period can admittedly be raised by the administration of iron, it is sometimes asked whether this is advisable; whether the usual figure of 70–75 per cent. at 6 to 9 months should not be regarded as the normal, rather than the 84 per cent. or thereabouts to which it can be raised by giving iron. The statement of Castle and Minot that iron only replaces a deficiency and never produces polycythæmia vera justifies the procedure, for if the hæmoglobin can be raised by this method, the existence of a deficiency is proved. A further justification is the observation of Helen Mackay (1931) that iron-fed babies show an increased freedom from infections.

BILE PIGMENTS

Though microcytosis usually means an iron deficiency, an inadequate supply of the pyrrol ring also limits the amount of available hæmoglobin, and therefore produces microcytosis. This is a rare occurrence, since the diet usually contains an adequate supply of pyrrol compounds and the pyrrol ring is conserved by the body as already described; nevertheless anæmia of the microcytic type can occasionally be cured by the administration of bile pigments, indicating an inadequate supply of pyrrol bodies. This has been shown in Witts's anæmia by Patek and Minot (1934) and by ourselves in a few instances of nutritional anæmia of infants. Patek and Minot found that they usually had also to give small doses of iron, but that the amount required was only about a tenth of the normal dose needed for the cure of idiopathic nutritional anæmia of adults. We have, however, been able completely to cure some cases of nutritional anæmia of infants by the daily administration of 0·5 g. of bile pigments. Patek (1936) also found that chlorophyll would sometimes produce a cure, but that at other times it had to be augmented with iron. Rarely, then, nutritional anæmia may occur from deficiency of pyrrol compounds in the body, but for such compounds to produce a cure the body must contain sufficient stores of iron.

COPPER AND OTHER METALS

The rôle of copper in the maturation of the red cell is as a mobiliser of iron, and it has been stated that cobalt, manganese, zinc, vanadium, and other metals are also essential for this purpose, though there is no clinical evidence of the occurrence of a nutritional anæmia as a result of shortage of these other elements. In rats, Hart and his colleagues showed that pure ferric chloride did not cure nutritional anæmia, but that the iron so given was stored in the liver and was only mobilised for building into hæmoglobin when copper was administered (Elvehjem and Sherman 1932). A nutritional anæmia due to lack of copper is the greatest rarity, but Hawksley (1934) reports the case of an infant suffering from hypochromic microcytic anæmia which was cured by the administration of copper sulphate, and we (Parsons and Hawksley 1933) have also recorded instances where the giving of copper in addition to iron has accelerated recovery. Fortunately only small amounts of copper are required by the red cell and practically all medicinal preparations of iron contain a sufficient amount; indeed, Prof. Haworth tells me that it is impossible to prepare an iron salt without a trace of copper. The amount necessary for cure is less than 0·025 mg. per day, as we have been able to cut the intake down to that amount and still produce a complete cure of nutritional anæmia. Nevertheless Elvehjem (1937) still maintains that to obtain the maximum regeneration of hæmoglobin in anæmic children it is necessary to give 1 mg. of elemental copper for every 25 mg. of elemental iron.

CALCIUM AND IRON

I have mentioned that a deficiency in calcium might possibly result in microcytosis and anæmia, in which case it would appear to be the result of the interdependence of calcium and iron metabolism. I can only indicate here a few of the possibilities of this relationship.

First: the metabolism of iron and calcium is very similar. They are both absorbed from the same part of the alimentary canal, the upper portion of the small intestine; both require an acid medium for their adequate absorption and therefore are less readily absorbed if achlorhydria is present; if too much phosphate is present in the small intestine both metals form insoluble salts and their absorption is impaired. There are, however, certain points of difference; thus, by limiting the amounts of calcium in the food it is easy to produce a negative calcium balance, but there is no definite evidence that a negative

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iron balance can ever be produced by limiting the iron intake. Again, sometimes an infant develops an iron-deficiency anæmia shortly after birth, although its mother, during and after pregnancy, is free from any signs of anæmia. In other words, she can conserve some of her iron at the expense of the fœtus, but on the other hand she is quite unable to withstand the exorbitant demands of the fœtus for calcium. This retention of iron by the mother does not always occur; more frequently the parallel between iron and calcium remains true and the child is normal at birth, although the mother may have become profoundly anæmic. Finally, with both elements both mother and child may be affected, thus, the mother may develop osteomalacia and the child show active rickets when born, or both mother and infant may show iron-deficiency anæmia.

Secondly: in certain severe and prolonged erythro-noclastic or erythro-leucoblastic anæmias decalcification of the bones and a negative calcium balance occurs. This has been presumed to be due to the necessity for providing larger areas for red bone-marrow, and it is found in certain chronic hæmolytic anæmias, such as acholuric jaundice, Cooley's anæmia, sickle-cell anæmia, and a rare form of hæmolytic anæmia studied by Smallwood and myself.

Thirdly: Brock and Diamond (1934) have proved that in rats the addition of large amounts of ferric chloride will convert a non-rachitogenic diet into a rachitogenic one. They have shown that this is not due to the chlorine radicle nor to the ferric chloride affecting the *p*H of the intestine, and also that this "iron rickets" can be prevented by the addition of excess phosphate enough theoretically to combine with all the ferric chloride as ferric phosphate. These facts, together with the presence of a low serum phosphorus in the iron-rickets rats, are strong evidence that large amounts of iron in the bowel by forming ferric phosphate prevent the proper absorption of phosphorus, and therefore the normal deposition of the calcium phosphorus compound in the bone.

Fourthly: by feeding rats on a diet extremely restricted in all the inorganic constituents an almost similar picture is produced to that obtained by feeding them on a minimal iron diet—viz., polycythæmia, microcytosis, and a reduction of hæmoglobin. This diet is extremely deficient in calcium and to a lesser degree in potassium, sodium, phosphorus, manganese, and chloride, and contains less iron than the rat is supposed to require. At first sight it appears that these changes are due to lack of iron, and the addition of iron to the diet does produce a cure, but the addition of adequate amounts of calcium also prevents the occurrence of these changes or cures them if they are present. Another interesting point is that only slight blood changes occur if edestin (a protein that contains little or no phosphorus) is substituted for casein (a phosphoprotein) in the diet, suggesting that the calcium-phosphorus ratio in the bowel may be a factor in iron absorption and therefore in erythropoiesis (Smith and Schultz 1930, Swanson and Smith 1932, Orten and Smith 1934, Swanson, Timson, and Frazier 1935, Orten, Smith, and Mendel 1936). We have attempted to apply these findings to clinical medicine by giving to children suffering from the hypochromic anæmia of cœliac disease large doses of calcium chloride for a period of three to four weeks, and then for a further period adding a minimal amount of iron (one-tenth of the usual dose), but in neither case has there been any significant effect on the anæmia.

These experimental observations raise two important clinical questions. First, what effects do large amounts of iron in the bowel have on the calcium-phosphorus ratio in the blood, and on the production of rickets? Secondly, what effects do large amounts of phosphorus in the bowel, such as may be produced by the consumption of considerable quantities of milk, have on the absorption of iron and on the metabolism of the red blood-cell? The answer to the first question is that the amounts of iron given to the rats were in relation to body-weight about twenty times the maximum dose usually given to the child, and therefore the risk of producing rickets is negligible, although it is conceivable that large doses of iron given to a child receiving a diet low in phosphorus might do so. Secondly, nutritional anæmia in late infancy in the artificially fed child is said to be due to the deficiency of iron in cow's milk as compared with breast milk, a deficiency which, according to some authorities, has been over-rated. It may, however, be due in part at any rate to the restriction of iron to the bowel by the presence of phosphorus. There is another and perhaps more important clinical point—namely, its bearing upon the regeneration of blood after gastric or duodenal hæmorrhage. It is a well-recognised fact that in treatment by a prolonged milk dietary the recovery of the blood is a very slow process, not greatly accelerated by the administration of iron salts. Recently, however, Meulengracht has shown that the blood returns to normal much more quickly by his method of dietary—which includes the early administration of meat, fish, and eggs—than on the usual milk diet. A possible explanation of this is that the presence of considerable amounts of phosphorus in the milk prevents the absorption of iron, and that the absence of large quantities of milk in the Meulengracht diet allows of greater absorption of the iron present in the diet or given medicinally. This effect of milk may be exaggerated by the practice of administering alkaline powders. Kellog and Mettier (1936) found that giving an iron-rich diet to 14 men anæmic from loss of blood from peptic ulcer had no effect on the formation of hæmoglobin when the upper part of the alimentary tract was made alkaline by a modified Sippey régime, but that after the alkalis were discontinued it had an effect comparable to that produced by adequate therapeutic doses of iron. Some clinicians now do not use alkaline powders in hæmatemesis or melæna unless the patient complains of pain.

THYROXIN

The action of thyroxin on the red blood-cell is well demonstrated by the blood findings in cretinism. The pallor of cretinism and myxœdema suggests a degree of anæmia greater than that usually revealed by an examination of the blood, but in 12 cretins under our care we found anæmia in every case.

This anæmia was usually orthochromic in type, with cells of normal size, but in two instances the cells were macrocytic in type, one being also hypochromic, and in only one case which had a combined thyroid and iron deficiency was microcytosis and hypochromia found. Radiological examination of the long bones of cretins shows very characteristic findings due to aplasia of the marrow and arrest of growth. With the complete or partial aplasia of the marrow the maturation of the red cell is completely or partially arrested, and this may occur at the megaloblastic or normoblastic level, producing a macrocytic or normocytic anæmia. Under thyroid treatment the marrow becomes active, growth is resumed, the red cell matures normally, and the anæmia is cured.

Difficulty is sometimes experienced in persuading a cretin to take solid food, and a milk diet may be continued for a considerable time beyond the normal lactation period. An iron deficiency may then also be present, the cells become microcytic in type, and iron as well as thyroid be necessary for complete cure.

Similar hæmatological findings are found in myxœdema; thus Lerman and Means (1932a) found a hæmoglobin of under 70 per cent. in about half of their 52 patients, and occasionally the blood picture strongly suggested pernicious anæmia, probably the megalocytic anæmia that I have described in cretins. Moreover, as in cretinism, the dietetic intake in myxœdema may be deficient and a macrocytic

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anæmia develop, in part from the absence of the extrinsic factor in the diet. Conceivably at times the intrinsic factor may also be lacking, because according to Lerman and Means (1932b) about half the subjects of myxœdema have gastric anacidity. In support of this conception and the existence of a mixed thyroid and "pernicious" anæmia, these workers found that there was much reticulocytosis and improvement of the blood after the administration of liver extract, and before the basal metabolic rate showed any response to thyroid medication. Similar results have been found by Holbøll (1936) in 28 patients with myxœdema. In 13 the hæmoglobin was below 70 per cent., 1 had a typical pernicious anæmia, 4 a colour-index over unity, and the others a normal or subnormal index. Thyroidin produced an improvement in all cases, but to obtain a hæmoglobin of over 80 per cent. it was also sometimes necessary to give iron.

VITAMIN C

The effect of vitamin C upon the maturation of the red cell parallels that of thyroxin. As a result of an inadequate intake of this vitamin we have observed anæmia both of the orthochromic normocytic type and of the macrocytic type, both forms being cured by the administration of ascorbic acid without other alteration in the diet and without giving any drug. Such results seem to furnish conclusive evidence that vitamin C is essential for the normal maturation of the red cell, yet there is no shadow of doubt that severe scurvy may occur without any sign of anæmia. It is natural, therefore, that opinions vary about the existence, frequency, and specificity of the anæmia in scurvy. Nowadays, owing to one of the "nutritional" triumphs of preventive medicine, it is rare for any one observer to see many cases of infantile scurvy. I have therefore been fortunate in seeing three instances of orthochromic normocytic anæmia, two of normocytic and slightly hypochromic anæmia, and two of macrocytic anæmia, all of which were cured by ascorbic acid, in a series of 14 children suffering from scurvy. These children demonstrated not only the specific effect of vitamin C and the uselessness of iron as a curative agent but also that anæmia is not always present in severe infantile scurvy—a fact that is difficult to explain, though it may be that under some conditions the bone-marrow suffers more damage than under others. After all, cases of severe scurvy differ considerably in their clinical manifestations, for instance, exophthalmos although a characteristic is nevertheless a rare sign, and factors such as injury or local infection may determine the appearance of certain symptoms. How otherwise can one explain the presence of severe manifestations in the legs and the escape of the upper limbs, or hæmorrhage around erupted and erupting teeth and their absence in the gums if the teeth are unerupted? Anæmia is then characteristic but not universal when the intake of vitamin C is inadequate. Scurvy in the adult is apparently more often associated with anæmia, since it is reported as occurring in 70–80 per cent. of those patients who have had their blood examined. The characters of the anæmia are similar to those in the infant.

SUMMARY

Thyroxin and vitamin C, therefore, are factors in normal red cell metabolism, and their action on the cells of the bone-marrow is throughout the whole range of maturation of the red cell from reticulo-endothelial cell to adult erythrocyte, and not restricted to a small portion of its maturation. Further, the anæmia of scurvy, cretinism, and myxœdema results from a slowing down of the whole process of erythropoiesis, which may become so great as to produce degeneration and aplasia of the red bone-marrow with the result that an anæmia, usually orthochromic and normocytic, is produced. At times, however, there is a disproportionate slowing of red cell development at the stage of maturation of megaloblast to normoblast, and a macrocytic anæmia occurs. In scurvy associated with large hæmorrhages into the tissues and from the mucous membranes a post-hæmorrhagic blood picture becomes superimposed, and the anæmia becomes hypochromic; conceivably in extreme cases it might even become truly microcytic. Finally anæmia in scurvy or cretinism may be due to a mixed deficiency of both vitamin C or thyroxin and iron.

This concludes my review of the factors that influence nutrition of the red blood-cell and in the absence of which there is nutritional disease—anæmia—of the erythron. It gives some idea of the great complexity and importance of intracellular chemistry in nutrition.

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SYMPATHETIC DENERVATION OF THE UPPER EXTREMITY

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THE end-results of cervicothoracic ganglionectomy are not satisfactory. Such has been the experience of many surgeons who have followed their patients for a sufficient length of time. Whether this operation be done for the Raynaud phenomenon or for other circulatory disturbance (e.g., acrocyanosis) the immediate satisfactory result is likely to change with time to a disappointing relapse. This relapse, which occurs usually from 6–9 months after the operation, differs, it is true, in extent in different patients. In some the relapse is total, but in the majority it is not so complete and the patient may be satisfied with what has been gained. But when these patients

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are examined by clinical tests and submitted to trial by nerve-block and sweating, the denervation of the limb is seen to be far from complete. This, at least, is my experience in a recent review of 34 cervicothoracic ganglionectomies done between 1931 and 1934.

It is otherwise with the operation of lumbar cord ganglionectomy done for lesions of the lower limb. Here the results are complete and permanent. My own cases operated upon in 1931 have recently been seen and all show that the denervation remains complete. Other writers have reported the same result after intervals longer than this. It is unlikely that Raynaud's disease in the hand differs in any material way from Raynaud's disease in the foot; it is obvious that the explanation of failure in the hand and success in the foot must be sought in the anatomy of the parts and in the technique of the operation.

On anatomical grounds it is plain that lumbar cord ganglionectomy is a preganglionic operation because the vasoconstrictor fibres are divided before they have reached the sacral ganglia which hold the cell-stations for the territory of the sciatic nerve. But if the cervicothoracic ganglion be removed the cell-stations for the arm are cut away; the peripheral fibres degenerate and the operation is postganglionic. It seems wellnigh certain that in these facts we have the explanation of success in the foot and failure in the hand. In this connexion the following case-history is of much interest:—

A woman, aged 27, suffered from Raynaud attacks in all four extremities. The disease had rendered her quite unable to earn her living as a bottle-washer. On April 30th, 1932, a bilateral lumbar cord ganglionectomy was done—the result was completely satisfactory and remains so after five years. On Feb. 16th, 1933, the cervicothoracic ganglion of the right side was excised; the operation was easy and the removal was complete. Within twelve months the Raynaud attacks returned in the right hand as badly as ever and they persist to the present. On April 22nd, 1933, an attempt was made to excise the left cervicothoracic ganglion by the posterior route. The thoracic cord was divided below the ganglion but an unusually high location of the ganglion prevented its removal owing to the roots of T.1 and C.8 lying between the operator and the ganglion. The wound was closed; all that had been done was a division of the thoracic cord below the ganglion. The result in this arm was good and remains after four and a half years.

This case shows that a complete ganglionectomy relapsed within twelve months but that a preganglionic section of the thoracic cord gave a good and lasting result.

Another observation of interest in this connexion is that in a patient who has had ganglionectomy done for Raynaud's disease in the hand the condition of the hand may have relapsed completely in six months, but the Horner syndrome remains and is undiminished at the end of five years. The stellate ganglionectomy is postganglionic for the arm and fails but is preganglionic for the eye and its effect remains unabated.

This clinical approach to the subject led me to devise and practise, for the upper extremity, a preganglionic type of operation which I described to the British Association of Surgeons in May, 1935. Long before this, the physiological approach had been shown by Lewandowsky (1903) and subsequently elaborated by Freeman and others (1934), Smithwick and others (1934), and by Grant (1935). The subject was reviewed in a comprehensive paper by White and others (1936). Recent work by Ascroft (1937) in monkeys still further confirms the opinion that in the surgery of the sympathetic nervous system a preganglionic is better than a postganglionic section.

THE PREGANGLIONIC OPERATION

The operation which I have practised in all cases since February, 1935, is a division of the thoracic ganglionated cord below T.3 ganglion with division of the rami which enter the cord from T.2 and T.3. The cervicothoracic ganglion and the white ramus from T.1 are left intact. The extent of the section is shown in Fig. 1. The illustration is purely diagrammatic and for the sake of clearness nothing but the essentials is shown. It is not my purpose to deal at any length with the physiology of this preganglionic section. This has already been done in two recent and important papers (White, Okelberry, and Whitelaw 1936, Simmons and Sheehan 1937) but clinical and experimental observations on patients operated upon by this method bring out two points.

The first is that the denervation of the hand corresponds to that effected in the foot and is pre-

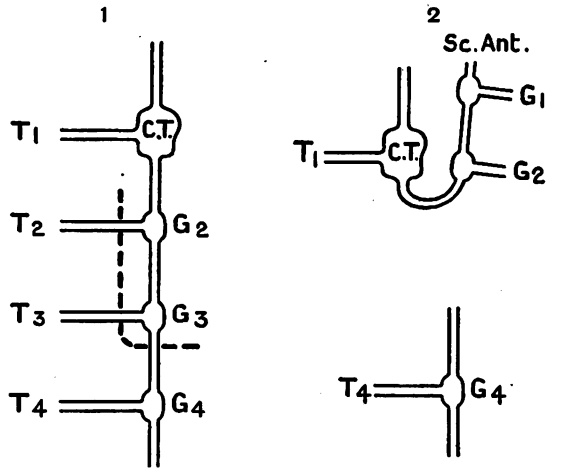

FIG. 1.—C.T. = cervicothoracic ganglion. G_2, G_3, G_4 = upper ganglia of the thoracic cord. T_1, T_2, T_3, T_4 = upper thoracic white rami. Interrupted line = line of section.

FIG. 2.—Sc. ant. = cut end of thoracic cord sutured to stump of scalenus anticus.

ganglionic in its character. This shows that the cell-stations for the arm are mainly and probably entirely in the cervicothoracic ganglion.

The second point is that if the white ramus of T.1 be left intact no trace of Horner's syndrome appears. It would seem that all the fibres of T.1 white ramus go headwards. The finding of Langley that, in the cat, the upper limit of vasoconstrictor fibres for the arm is T.2 is thereby confirmed for man.

I have done this operation on 25 occasions since February, 1935. The results have proved very gratifying in comparison with those obtained by cervicothoracic ganglionectomy. The majority of these cases are, as yet, hardly of sufficient age to warrant an opinion that the result is permanent, but the two following cases may be quoted. They represent respectively the first case of acrocyanosis and the first case of Raynaud's disease in which I did the preganglionic operation.

1. A girl of 19 years, a shop assistant, had suffered since 14 years of age from acrocyanosis and pernio of both hands. She was worse in the winter, but never entirely free in the summer; latterly she had been unable to follow her employment. A bilateral preganglionic operation was done in February, 1935. Both hands have been of good colour, warm, and dry since the operation and remain without change 2½ years after the operation.

2. A woman of 32, a domestic servant, had suffered for many years from typical and severe Raynaud's disease; latterly she had been unable to work. In January, 1936,

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she underwent a bilateral preganglionic section. Since that date there has been no further attack and both hands are normal at the end of 21 months.

In three of the earlier cases some degree of relapse has been seen. One of these, a bilateral relapse, yields evidence which suggests that regeneration of sympathetic fibres has occurred. Brief details of this case are:—

The patient, a domestic servant aged 19, had suffered from childhood with severe acrocyanosis and pernio of the hands. A bilateral preganglionic section was done in June, 1935. The right hand relapsed three months and the left hand five months after the operation and both are now "almost as bad as ever." Investigations of this patient by ulnar nerve-block and by sweating point to a high degree of regeneration.

From the facts of this case it is clear that insufficient attention had been paid at the time of operation to the almost uncanny power of regeneration which the autonomic system is known to possess. Since this experience I have in all cases either ligatured or put silver clips on the cut ends and have slung the upper end to the scalenus anticus muscle. This manœuvre is depicted in Fig. 2. Since doing this none of the cases has, so far, shown any relapse.

THE SURGERY OF ACCESS

The operation is done by the anterior approach. This route has been well described by several writers, but the following additional points may prove of value to any surgeon attempting the operation for the first time.

The clavicular head of sternomastoid varies considerably in its lateral extent and should be divided in its outer third or even half. The phrenic nerve is best protected by retraction with a broad piece of soft tape and the same method serves admirably for the subclavian artery at a later stage of the operation. The scalenus anticus must be divided at its insertion but if a few of the most medially placed fibres are left intact any danger of injury to the thoracic duct is avoided. The subclavian artery is freed from any of its branches which interfere with full downward retraction of the main trunk; it is most important that the superior intercostal artery be ligatured. This artery arises from the posterior aspect of the subclavian artery in its second stage; ligature of this branch renders almost bloodless the field of operation around the ganglion and the upper thoracic cord. The utmost care must be taken to avoid crude retraction of the brachial plexus. Downward displacement of the parietal pleura is best effected by pressure of the forefinger or of a gauze swab in a holder. If it prove difficult, it is safest to pick up the more resistant strands of Sibson's fascia on a nerve-hook and divide them with the knife. Good illumination is essential and is best obtained by a Cameron light which when introduced into the depths of the wound serves as a useful depressor of the pleura. Finally, in dividing the cord, watch must be kept for the possible existence of a Kuntz nerve, an occasional contribution from the second thoracic ganglion to the brachial plexus, running lateral to the cervicothoracic ganglion to reach the lowest trunk of the plexus. This contribution is postganglionic and if encountered must, of course, be saved. It is, however, rare; I have seen it twice only in 49 operations.

An operation, very similar to the above but done through a posterior incision, is described by Smithwick (1936). This writer also insists on the need for adequate safeguard against regeneration. There is good reason to hope that a preganglionic section carried out by one or other of these methods will give results in the hand equal to those so consistently obtained in the foot. If this prove to be the case the surgical treatment of vascular lesions of the upper limb will be placed on a surer basis. At least one can state with confidence that in circulatory disturbances of the upper extremity cervicothoracic ganglionectomy should no longer be done.

SUMMARY

1. A comparison is given of the results obtained by ganglionectomy in the upper and lower limbs.

2. The practice of a preganglionic section for the upper limb is advised and a technique is described.

3. Cervicothoracic ("stellate") ganglionectomy should no longer be done for vascular disturbances of the upper limb.

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THE PREVENTION OF SPONTANEOUS MAMMARY CANCER IN MICE

BY THE THYROTROPIC HORMONE OF THE PITUITARY GLAND

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THE observation recorded by us two years ago,[2 3 4] and since confirmed by several observers,[1 9 11 12 16] that the development of mammary cancer in the mouse by the continued application of œstrin is accompanied by a profound disturbance of the whole endocrine apparatus, particularly of the pituitary gland and of the adrenal glands, led us to consider the possibility that these endocrine changes may be ætiologically related to the process of carcinogenesis in the mamma.

The adrenal and the pituitary glands are affected by œstrin in two opposite directions. In the adrenals the change is a frankly degenerative one, while a detailed histological study of the pituitary body at different stages of œstrinisation led us to the conclusion that the changes in the anterior lobe are an expression of an initial stimulation of this part of the gland. In order to redress the hormonal balance disturbed by the presence of excessive amounts of œstrin administered to the organism, the chromophil cells, and particularly the acidophil cells of the anterior lobe of the pituitary, secrete their specific hormones. This stimulation to increased functional activity of the anterior lobe produces a hyperæmia and a hyperplasia of this lobe, together with a progressive degranulation of the acidophil cells, which enlarge and assume the appearance of chromophobe cells. If the œstrinisation is continued sufficiently long this process leads eventually to an exhaustion of the anterior lobe, which is then greatly enlarged, deeply congested, and composed almost entirely of chromophobe cells.

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It is thus possible to account for the apparent paradox that one can produce experimentally a great increase in the mass of the gland in association with symptoms similar to those found after its destruction or operative removal.

HISTOLOGICAL CHANGES

If this conception is correct, it means that one or more hormones of the anterior lobe of the pituitary gland are capable of antagonising the effect of œstrin

PHOTOMICROGRAPHS OF SECTIONS CUT THROUGH THE PARS ANTERIOR OF THE PITUITARY GLAND OF EXPERIMENTALLY TREATED MICE. ALL SECTIONS WERE DIFFERENTIALLY STAINED, BY A MODIFICATION OF MALLORY, TO SHOW THE ACIDOPHIL, BASOPHIL, AND CHROMOPHOBE CELLS. (A, Low power; B, High power)

FIG. 1. ŒSTRIN ALONE

FIG. 2. ŒSTRIN AND THYROTROPIC HORMONE

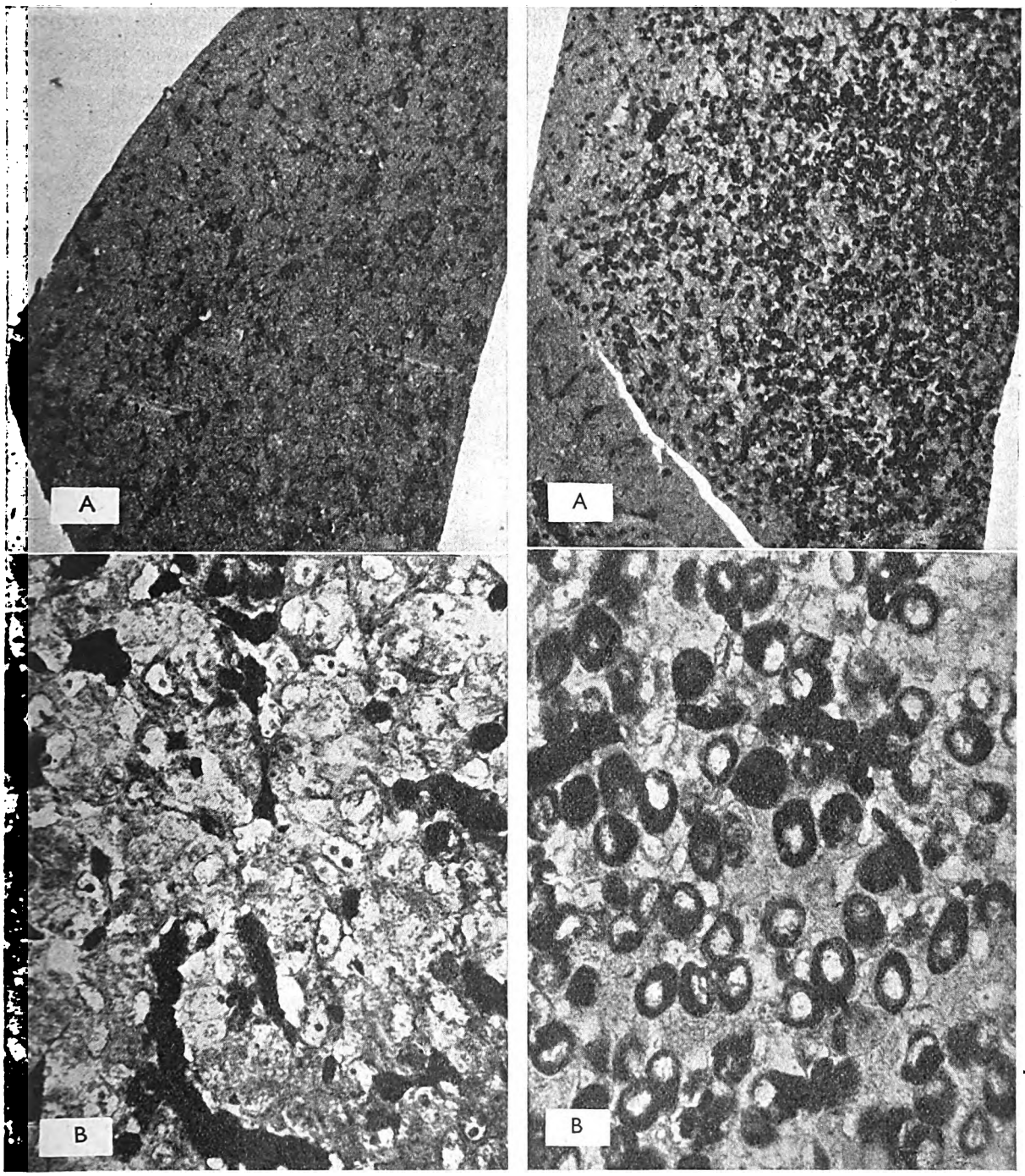

FIG. 1.—From a male mouse (No. 958) after seven months' œstrin treatment. Note the absence of acidophils and the presence of intense congestion.

FIG. 2.—From a male mouse (No. 956) after seven months' treatment with œstrin and thyrotropic hormone. Compared with control in Fig. 1, there are a large number of deeply staining acidophils and no congestion.

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on the pituitary gland, and possibly also its carcinogenic action on the mamma. Experiments with mice of mixed strains showed that the changes produced in the anterior lobe of the pituitary gland by the prolonged application of œstrogenic hormones could be prevented by the simultaneous administration of preparations containing the thyrotropic hormone of the anterior lobe.

Fig. 1 gives low-power and high-power views of the anterior lobe of the pituitary from a male mouse by œstrin. Fig. 4 represents the mamma of another male mouse treated with œstrin for the same length of time, but receiving also injections of the thyrotropic hormone.

PREVENTION OF SPONTANEOUS CANCER

Having demonstrated the physiological antagonism between œstrin and the thyrotropic hormone so far as the pituitary and the mamma are concerned, another series of experiments was carried out in order to see

PHOTOMICROGRAPHS OF SECTIONS OF THE MAMMARY GLANDS OF EXPERIMENTALLY TREATED MICE. (Low power)

FIG. 3. ŒSTRIN ALONE

FIG. 4. ŒSTRIN AND THYROTROPIC HORMONE

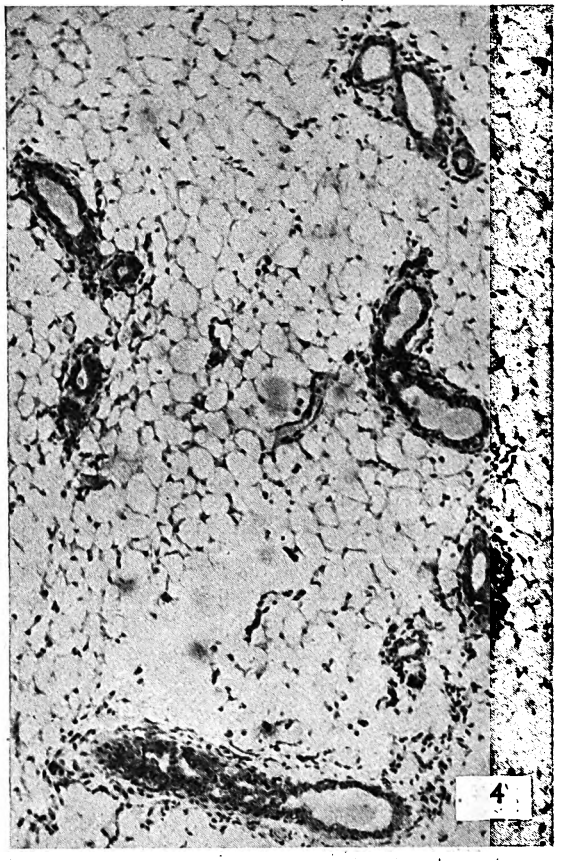

FIG. 3.—Mamma of same male mouse as in Fig. 1 (œstrin alone for seven months). Note the active proliferation, and secretory activity.

FIG. 4.—Mamma from same male mouse as Fig. 2 (œstrin and thyrotropic hormone for seven months). Note the inhibition of development, and compare with Fig. 3.

of the mixed laboratory stock after œstrinisation for seven months. The sections show the typical œstrin effect—an intense congestion and an almost complete disappearance of the acidophil cells. This figure serves as a comparison with Fig. 2, representing the anterior lobe of a pituitary gland of a male mouse from the same stock, subjected for the same length of time to a combined treatment with œstrin and the thyrotropic hormone (Schering). This presents an almost normal appearance; there is no congestion and there are numerous acidophil cells, although compared with the gland of a normal mouse there is a distinct diminution in their number. The proliferation induced in the mamma by the continued application of œstrogenic hormones can also be kept in check by the simultaneous administration of the thyrotropic hormone as shown in Figs. 3 and 4. Fig. 3 demonstrates the proliferation induced in the mamma of a male mouse of the laboratory stock whether the continued administration of the thyrotropic hormone would prevent the spontaneous development of mammary cancer in a highly inbred strain of mice, with a high incidence of spontaneous mammary cancer in the females.

The strain used for these experiments is the R.III strain, bred originally by Madame Dobrovolskaia-Zawadskaia [5] of the Institut du Radium in Paris and maintained in these laboratories since 1934 by brother and sister mating. Both the males and the females of this strain are much more susceptible to œstrin than the mice of our mixed laboratory stock. This increased susceptibility to œstrin manifests itself, not only by the earlier and more frequent appearance of mammary carcinomata in the mice of the R.III strain subjected to œstrinisation, but also by the greater extent of the changes produced

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in the pituitary gland and the adrenal glands in the mice of this strain. For the adrenals, this is readily explained by the fact that the "brown degeneration" induced by œstrin in mice of the laboratory stock sets in spontaneously in the mice of the R.III strain, so that in these animals œstrinisation intensifies an already existing process.[4] The most striking manifestation of this increased susceptibility is that in some individuals of this strain the first application to the skin of a 0·01 per cent. solution of œstrin in chloroform produces sudden death. This remarkable phenomenon, which resembles in its appearance an anaphylactic shock, has been observed about 20 times in young mice of this strain that have a kinked tail and do not grow well.

The R.III strain has a mammary cancer incidence of about 60 per cent. in the breeding females reaching an age of 12 months or more. Two families of this strain were available—the Y family and the Z family—which show a slight difference in the age-incidence of mammary cancer, as shown in Table I:—

TABLE I—AGE-INCIDENCE OF SPONTANEOUS MAMMARY CANCER IN R.III FEMALES

Age (months).	Number of mice with mammary cancer.			
	Family Y.		Family Z.	
	Breeding.	Non-breeding.	Breeding.	Non-breeding.
4 ..	2	..	..	..
5 ..	2	1	..	..
6 ..	2	1	1	..
7 ..	4	1	2	1
8 ..	3	2	3	..
9 ..	1	2	3	1
10 ..	1	..	4	..
11 ..	..	..	1	..
12 ..	1	..	1	..
13 ..	..	..	1	1
14 ..	..	..	1	1
15 ..	..	..	1	..
Total number of mice ..	16	7	18	4

In the Y family the earliest mammary cancer observed so far has appeared after four months, while in the Z family the earliest mammary cancer has developed after six months. The cancer incidence then increases rapidly in both families, so that of all the females developing mammary cancer one half shows the process of carcinogenesis completed after seven months in Y family, and after nine months in the Z family. The cancer incidence in those females that proved to be sterile, though kept with males, is represented separately in Table I under the heading "non-breeding." This is necessary because the female mice treated with thyrotropic hormone, although kept with males, did not litter.

For a strict comparison, the results in the mice treated with thyrotropic hormone should be compared with the incidence of mammary cancer in untreated females, which, though kept with males, had not littered. There are on record 22 such animals, of which 11 (50 per cent.) developed cancer of the mamma. As can be seen from Table I, in which the age-incidence of the tumours in the non-breeding mice is recorded separately, cancer develops at very much the same ages in these mice as in the mice that produced litters. Only the total incidence is slightly diminished. A decrease of a similar order of magnitude in non-breeding mice has also been found in some other strains (Lathrop and Loeb[10]), but does not occur in all strains. In the dilute brown Murray-Little strain in which Murray[13] had at first described the great diminution in the cancer incidence among virgin as compared with breeding females, he subsequently failed with Little[14] to observe any great difference, and Korteweg's observations[7] on the same strain also showed a similar cancer incidence in virgin and in breeding females. In another strain bred by Kreyberg[8] the same cancer incidence was found in breeding and in sterile females. On the other hand, a marked diminution of the cancer incidence in non-breeding females has been observed recently in several strains by Loeb and his collaborators.[15]

Two different preparations of the thyrotropic hormone were used.

The first, the thyrotropic hormone isolated by Junkmann and Schoeller[6] is a yellow powder that has been biologically assayed, 1 mg. containing 10 guinea-pig units. A dose of 2·5 guinea-pig units of this preparation were injected five times weekly into the subcutaneous tissues. This preparation is stated to be free from the gonadotropic hormone, but it contains also the corticotropic (adrenalotropic) hormone. We are greatly indebted to Prof. W. Schoeller of Schering for placing this valuable material at our disposal free of charge. The other preparation used is Ambinon (Organon), which is stated to contain the thyrotropic and gonadotropic hormones. It is a watery fluid that has been biologically assayed and 1 c.cm. contains 150 guinea-pig units of thyrotropic hormone and 50 units of gonadotropic hormone. It was injected twice weekly in doses of 0·1 c.cm. (15 units of thyrotropic hormone).

The total dosage per week of these two preparations is therefore 12·5 units of the Schering preparation and 30 units of the Organon preparation. Altogether 25 females of the R.III strain, belonging mainly to the Y family, were submitted to the treatment which began at the age of 2 months—19 with the Organon and 6 with the Schering preparation.

The treatment with thyrotropic hormone was started just before the mice had reached sexual maturity, as in this strain cancer may develop as early as the

TABLE II—EFFECT OF PITUITARY HORMONE ON THE DEVELOPMENT OF MAMMARY CANCER IN R.III FEMALES

Family Y = 21 Females. Family Z = 4 Females

Nature of hormone preparations.	Age in months—		Number of mice.	
	At beginning of experiment.	At time of recording, Dec. 1st, 1937.	Mammary cancer—	
			With.	Without.
Gonadotropic and thyrotropic.	2	12	0	8
	2	13	0	3
	2	14	0	3*
	2	16	0	3
	3	16½	0	2
Thyrotropic and corticotropic.	1	10	0	1
	2	11	0	1*
	2	11	0	4
Total number of mice ..	..	..	0	25

* The mice marked with an asterisk belong to the Z family.

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fourth or fifth month, and immediately after the birth of the first litter. Although the females were kept with males, none of the treated females littered. The results are summarised in Table II. None of the mice treated with the thyrotropic hormone developed a carcinoma of the mamma, although the mice had reached an age, varying from 10–16½ months, at which in about 50 per cent. of the mice, if untreated, tumours would have appeared. The thyrotropic hormone had therefore inhibited the process of spontaneous carcinogenesis in the mammary gland. Most of the mice are still alive.

DISCUSSION

Lacassagne has already pointed out that the high incidence of spontaneous mammary cancer in the R.III strain cannot be due to an excessive secretion of œstrogenic hormones. Our results suggest that a disturbance in the endocrine balance between the ovary and the anterior lobe of the pituitary is an ætiological factor in the development of cancer in the mamma. This would account not only for the high incidence of mammary cancer in this strain, but also for the increased susceptibility to the general systemic effects of œstrin in the animals of this strain. If a complex endocrine defect of this kind is a factor in the development of cancer of the mamma it should be possible to identify in women a type characterised by this defect and by a high incidence of mammary cancer, and by correcting this defect by the administration of thyrotropic hormone to prevent cancer of the mamma. This is a subject for clinical investigation. We are now engaged in investigating the ætiological relationship between the adrenal changes, described by us in previous papers, and mammary cancer.

The physiological antagonism between the œstrogenic and the thyrotropic hormone has a bearing on therapeutic applications. Thus, the thyrotropic hormone may be useful in the treatment of conditions supposed to be due to an unbalanced action of the œstrogenic hormones such as the precancerous condition of the breast known as cystic disease of the breast (maladie de Reclus, Schimmelbusch's disease), and benign enlargements of the prostate.

SUMMARY

1. The spontaneous development of cancer of the mamma in female mice of a special strain having a high incidence of mammary cancer can be prevented by the thyrotropic hormone of the anterior pituitary gland.

2. The changes in the anterior lobe of the pituitary gland, as well as the development of the mammary gland in males, produced by prolonged œstrinisation can be kept in check by the simultaneous administration of the thyrotropic hormone.

3. The thyrotropic hormone is therefore in some respects a physiological antagonist to the œstrogenic hormone.

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SURGICAL TREATMENT OF ANGINA PECTORIS

AND ALLIED CONDITIONS

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(*Concluded from p. 10*)

GROUP II—OTHER SYMPTOMS OF CARDIAC ISCHÆMIA

WE do not dispute that angina of effort is caused by a defective blood-supply to the heart—indeed we would submit that the results in Cases 1, 4, 5, 8, 9, 10, and 15, when revascularisation relieved pain, contribute new and important evidence of this fact—but we also know that the most extreme degree of cardiac ischæmia may exist without causing pain at all: an infarct may form and even progress to rupture before pain is experienced. Again, although coronary thrombosis is a common complication of angina pectoris, if a large group of patients with coronary thrombosis be interrogated it will be found that often the warning symptom has been not pain but shortness of breath on exertion or a feeling of

TABLE II—RESULTS OF OPERATION IN PATIENTS WITH SYMPTOMS OTHER THAN ANGINA

Case.	Age and sex.	Diagnosis.	Operation.	Date.	Result.
3	44 F.	Hypertensive failure.	Cardio-omentopexy by suture with insertion of aleuronat.	Oct. 2, 1936.	Symptom-free.
6	48 M.	Cong. heart. Stokes-Adams syndrome.		Feb. 5, 1937.	Died 9½ months later.
12	53 F.	Bundle-branch block.	Transpleural pericardiotomy for insertion of aleuronat.	April 30, 1937.	Improved.
16	56 F.	Auricular fibrillation		June 25, 1937.	Discharged from hosp., in statu quo.
20	64 M.	"	Cardio-pneumonopexy with aleuronat only.	Aug. 27, 1937.	Discharged from hosp., in statu quo.

oppression in the chest. It is certainly an advantage when assessing the value of the operation to have as a measure of any therapeutic success a clear presenting symptom like angina of effort rather than vague symptoms of cardiac dysfunction, and we have therefore concentrated on the treatment of the angina group; but, bearing in mind that even in the absence of pain cardiac ischæmia may be fatal and with the more remote consideration that ischæmia is now believed to play a part—and possibly the dominant part—in that large group of cases formerly labelled "chronic myocarditis" or "myocardial degeneration," we have not felt justified in denying patients, purely as a matter of policy, the possible benefit of operation when we have felt that their symptoms were due to a defective blood-supply. Five in this group have been thus treated (Table II). In Case 3 recovery from a sudden attack of congestive heart failure had

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been slow and incomplete; the patient was unable to lie down and the presence of pulsus alternans and a gallop rhythm indicated an extreme degree of myocardial change. The electrocardiogram showed inversion of the T waves in all leads, she had a negative Wassermann reaction and no valvular disease. In Case 6 we knew that despite a congenital defect of the heart the man had led a more or less normal life until two years before he consulted us as a bedridden cardiac patient. Then new symptoms appeared, the most important being repeated Stokes-Adams attacks. There was marked arterio-sclerosis, and it was decided that the *new* factor which had developed was cardiac ischæmia. In Case 12 we had a history of repeated attacks of severe cardiac failure, and here the presence of a bundle-branch block made it fairly clear that there was a defective coronary tree. In Case 16 the history pointed to the sudden onset of auricular fibrillation, which in view of the patient's age was almost certainly ischæmic in origin. Case 20 was similar.

CASE 3

A paper-seller, aged 44, was admitted to Lambeth Hospital on March 5th, 1936, with the story that she had collapsed in the street five weeks before with pain under the heart. She took to her bed for three days. She had been breathless on exertion for a fortnight before the attack, and since it had noticed increasing cough and breathlessness and a "stitch in the heart on hurrying." She had had no previous illnesses. Her father died of angina pectoris. Her mother suffers from hypertension.

Physical *examination* showed a short well-nourished woman in considerable distress, cyanosed and dyspnœic. Her mouth was grossly septic. The heart was enlarged. There was tachycardia and a well-marked gallop rhythm. The blood pressure was 200 mm. systolic and 140 diastolic. Râles were present at both bases. The liver was palpable but there was no ascites and no œdema. The urine was loaded with albumin and the blood-urea was 52 mg. per 100 c.cm. The Wassermann reaction was negative. The electrocardiogram showed inversion of T waves in all leads. A diagnosis of left-sided heart failure in hypertension, possibly due to coronary thrombosis, was made.

In spite of rest in bed progressive heart failure ensued, and on July 10th, four months after admission, examination showed the heart grossly enlarged clinically and radiographically (Fig. 7) and the gallop rhythm unchanged. The blood pressure had fallen to 170 mm. systolic and 130 diastolic. The venous pressure was 270–280 mm. of saline in the antecubital vein. There were râles at both bases and a small pleural effusion on the left side. The liver was much enlarged. There were ascites and gross œdema of the legs and lumbar region. The electrocardiogram showed inversion of T waves as before.

From this date she gradually improved. The abdomen was tapped twice, and caffeine, digitalis, and Salyrgan were administered. In September all her teeth were extracted. On Oct. 1st, seven months after admission, she was able to get up for two hours daily, and was free of symptoms except for slight dyspnœa on exertion and an inability to sleep lying down. The gums had healed well. The heart was not enlarged clinically and X ray examination showed remarkable decrease in its transverse diameter (Fig. 8). Gallop rhythm, however, persisted and there was a definite pulsus alternans, confirmed by the sphygmomanometer which showed a blood pressure of 210–190 mm. systolic and 120 diastolic. The venous pressure had fallen to 160–165 mm. of saline. Râles were no longer audible at the bases but pleural friction was present on the left side. The liver edge was just palpable. There was no ascites or œdema. The electrocardiogram showed increase of voltage and less marked inversion of the T waves.

Cardio-omentopexy was performed on Oct. 2nd, aleuronat being inserted into the pericardial sac and applied to the graft before its suture to the heart. At the end of the operation the pulse-rate varied from 100 to 120, the blood pressure was 104 mm. systolic and 80 diastolic, and the electrocardiogram showed no change. Recovery was uneventful. Four weeks after operation the heart sounds had improved in tone, there was no gallop rhythm or pulsus alternans, and the blood pressure had risen to 150 mm. systolic and 90 diastolic. The electrocardiogram showed progressive left axis-deviation. She was transferred to St. Benedict's Hospital for convalescence on Jan. 27th, 1937, was gradually activated there and discharged home on April 6th, free of symptoms.

She has since led a full and active life without medication. X ray examination shows normal movement of the left diaphragm and further diminution in the size of the heart shadow (Fig. 9). Her blood pressure is 210 mm. systolic and 130 diastolic.

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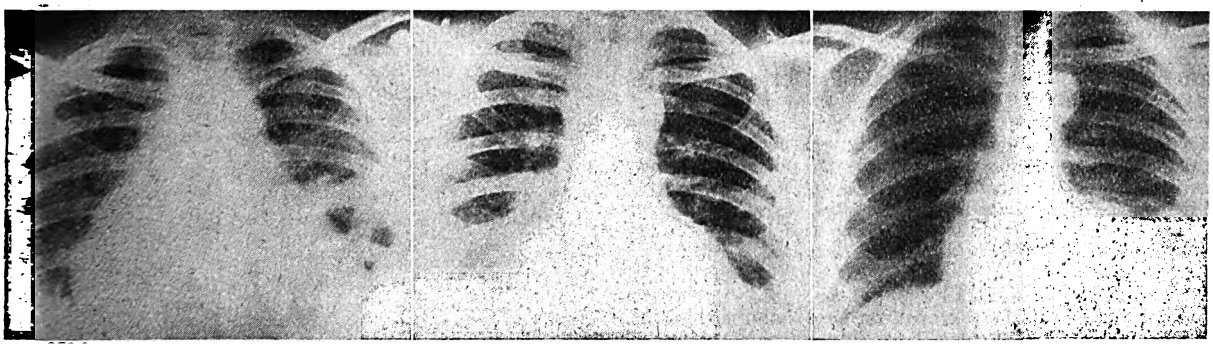

FIG. 7.—Radiogram in Case 3, showing the degree of cardiac enlargement four months after admission.

FIG. 8.—Same heart the day before operation.

FIG. 9.—Same heart thirteen months after cardio-omentopexy.

CASE 6

A coachbuilder, aged 48, entered Lambeth Hospital at the request of Dr. A. M. Gammie of Hounslow on Jan. 19th, 1937, for investigation as a case of Stokes-Adams syndrome. The first attack occurred in June, 1933, after two years of increasing lassitude. He was treated more or less in bed for nine months, during which attacks were frequent. He then remained free of attacks until Oct. 10th, 1936, when they returned. From that date he had been in bed on and off, and continuously so for the last month. His present condition varied: one day he dared not move, on the day of admission he sat up for breakfast and had only three or four slight attacks in spite of a long ambulance journey. Consciousness was lost during three attacks only, the first and two recently. He usually remained conscious and had a sensation of floating towards the ceiling. He had been treated with Calcio-coramine three times, and ephedrine gr. ½ twice, a day, and his wife kept a syringe of adrenaline in the bedroom.

He had had no previous illnesses. He was said to have had rheumatic fever at the age of 3, and was placed in category B3 in the war because of his heart. His father died of a stroke aged 74, and his mother reached the

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age of 84. A brother died of auricular fibrillation aged 60, a sister died of rheumatic heart disease aged 17, and another sister was suffering from tachycardia.

On *examination* he appeared a lean but well-nourished man, lying flat in bed without distress. His tongue was moist and clean but his remaining lower teeth were septic. There was well-marked radial and brachial arterio-sclerosis. The apex-beat was in the 4th intercostal space, 4 in. from the midline. The cardiac impulse was visible, forcible, sustained, and definitely biphasic. The mitral first sound was much accentuated and booming, the aortic second sound accentuated. There was a third sound at the apex. The rate was constant at 40 per minute. There was a systolic murmur, heard well in the pulmonary area and conducted into the vessels of the neck. There was also a very short but definite aortic diastolic whiff. The blood pressure was 190 mm. systolic and 60 diastolic. Nothing abnormal was found in the lungs, abdomen, and central nervous system. The urine was normal and the Wassermann reaction negative. The blood-urea was 40 mg., the calcium 9·0 mg., and the phosphorus 1·8 mg. per 100 c.cm. X ray examination showed a large globular heart. The electrocardiogram showed 2 : 1 heart-block at a ventricular rate of 39, with inverted T waves in lead I and diphasic T waves in leads II and III. There was slight right axis-deviation, the S waves were notched in all leads, and the S–T interval was slightly depressed in leads II and III. Atropine had no effect either on the rate or the block. A diagnosis was made of cardiac ischæmia, superimposed upon a congenital interventricular septal defect insufficient in itself to produce heart-block. It was suggested that the presence of a congenital heart lesion might explain the diagnosis of rheumatism in infancy and also why he was classified B3 at a time when he felt himself to be an A1 man. (He could push a heavy roller and play strenuous tennis without breathlessness or distress.) His remaining teeth were extracted on Jan. 26th. On Feb. 1st there was a brief return to normal rhythm, confirmed by electrocardiogram, and during it the mitral third sound disappeared. The blood pressure remained steady at 190 mm. systolic and 90 diastolic. The venous pressure was 145 mm. of saline in the antecubital vein.

Cardio-omentopexy was carried out on Feb. 5th. The left lung was adherent to the pericardium. The heart was enormous but the pericardium was not tense—facts which suggested that they had "grown up" together, for in cardiac hypertrophy due to acquired lesions the pericardium is found tense during life. The inferior pericardial ligament was not observed. The omental graft, which was obtained with some difficulty and contained very little fat, was vascular but smaller than in any previous case. It was sutured and aleuronat inserted freely. There were no pericardial adhesions and some excess of fluid. The pericardium was not completely closed. An electrocardiogram taken one hour afterwards showed that the pre-existing sinus rhythm was being interrupted and largely replaced by an independent ventricular rhythm (rate −32 per min.), arising from an ectopic focus in the left ventricle, possibly the point at which the graft was sutured. The blood pressure at this stage varied between 130 mm. and 115 systolic and 70 and 60 diastolic. Three hours later it was steady at 122 mm. and 64. Recovery was uneventful. Pericardial friction was audible on the third day. Administration of ephedrine and calcio-coramine was continued for a fortnight. The blood pressure slowly rose to remain constant at 160 mm. systolic and 70 diastolic. He was allowed up at the end of four weeks and was discharged home on March 22nd.

The electrocardiogram during the first week after operation showed varying 2 : 1 and 3 : 1 heart-block and a raised S–T interval in leads I and II. At the end of four weeks the T waves had become inverted in all four leads. During the second month the ectopic ventricular beats began to reappear, while the T waves of normal ventricular complexes slowly recovered and became positive. By the end of three months, however, the ectopic focus had established a regular ventricular rhythm with complete heart-block, which persisted. He had no Stokes-Adams attacks after the operation. He felt quite fit in himself and was leading a normal life, though there was some shortness of breath during strenuous exertion such as gardening. X ray examination on Sept. 24th showed that the left diaphragm was still at a higher level than the right but had recovered some normal movement of its inner end.

Early in November, 1937, he caught a chill. He was readmitted to Lambeth Hospital on Nov. 17th, and died four days later of congestive heart failure. Post-mortem examination revealed a moderate coarctation of the aorta just proximal to the ductus arteriosus, which was patent. There was no septal defect. Histological examination of the heart with its attached graft is in progress. It is suggested that the improvement, which followed operation, may have been due to the fixation of an ectopic ventricular rhythm rather than to revascularisation via the graft.

CASE 12

A housewife, aged 52, was transferred to Lambeth Hospital on March 30th, 1937, with a history of sudden attacks of left-sided heart failure, which had necessitated her admission to hospital six times during the past three years. The attacks were painless. She had been in hospital since the beginning of her last attack in autumn, 1936. She had acute rheumatism at the age of 21, for which she was in bed for over three months. She had had eleven children. Her father died of "myocarditis, asthma, and pneumonia," and her mother of a stroke.

Examination showed a cheerful, well-nourished, high-complexioned woman, propped up in bed but not distressed. The tongue was moist and clean. There was marked pyorrhœa. The apex-beat was in the 5th intercostal space, 3½ in. from the midline, and the cardiac impulse was heaving. The mitral first sound was low-pitched and accentuated, and the aortic second sound somewhat ringing. The sounds were spaced and gallop rhythm was present. A soft systolic murmur was audible at apex and base. There was no radial arterio-sclerosis. The blood pressure was 172 mm. systolic and 98 diastolic. There were obvious veins over the upper part of the chest in front and a few fine râles at both bases. Nothing abnormal was found in the abdomen and central nervous system, and there was no œdema. The urine and kidney function tests were normal and the blood-urea was 40 mg. per 100 c.cm. The Wassermann reaction was negative. X ray examination showed a large heart. The electrocardiogram showed a typical right bundle-branch block (old terminology). Her remaining teeth were extracted under Evipan anæsthesia on April 13th.

Left *thoracotomy* was performed on April 30th. The heart was found to be much enlarged and the pericardium unusually thin. The phrenic nerve was not crushed. The pericardium was opened, aleuronat inserted, and the pericardium closed with one suture. The pulse-rate at the end of operation was 96 and the blood pressure 132 mm. systolic, and 92 diastolic. Recovery was uneventful. There was moderate pyrexia for a week and a leucocytosis reaching 16,400 per c.mm. No pericardial friction was heard. She was allowed up at the end of four weeks, gallop rhythm being still present. She was transferred back to Hounslow Hospital on May 15th, 6½ weeks after operation. There was then no definite gallop rhythm and the electrocardiogram showed left axis-deviation, inversion of T waves in leads I and II, and a disappearance of bundle-branch block.

She was seen again on August 20th. The heart sounds were of fair quality, with less spacing than formerly and no gallop rhythm. The sphygmomanometer revealed systolic alternation between 180 mm. and 160. The electrocardiogram showed a return to bundle-branch block. On Oct. 12th she was still in hospital and up and about the ward most of the day without breathlessness. The blood pressure was 160 mm. systolic and 100 diastolic, without alternation. There was no gallop rhythm. Bundle-branch block had persisted. She has now been discharged home.

CASE 16

A housewife, aged 56, was admitted to Lambeth Hospital on May 15th, 1937, with the story that she had been seized with a sudden attack of breathlessness and throbbing pain beneath the breast-bone while on holiday in August, 1936. The pain had lasted a couple of days and forced her to take to her bed. She had had several similar

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attacks since. She was an in-patient in Lambeth Hospital during March and April, 1937, when she was found to be suffering from auricular fibrillation of sclerotic type. Since her discharge she had complained of increasing breathlessness and a sense of suffocation. Her father died of rheumatic fever when she was an infant and her mother of a stroke. Her previous health had been good and she had never had rheumatic or scarlet fever. She has three children.

On *examination* she was found to be dyspnœic and cyanosed. Her heart was enlarged and fibrillating rapidly. There were a few râles at the right base. Her liver was enlarged and tender but there was no œdema. She improved rapidly on digitalis and began to get up on June 8th. She was referred to the Cardiovascular Clinic on June 13th. There was no radial arterio-sclerosis. Her blood pressure was 160–175 mm. systolic and 100 diastolic. The urine was normal. The blood-urea was 23 mg. per 100 c.cm. and the urea-concentration test showed 1·4 per cent., 1·8 per cent., and 2·0 per cent. of urea. The Wassermann reaction was negative. The basal metabolic rate was +12 per cent. X ray examination showed a large triangular heart. The electrocardiogram showed auricular fibrillation of sclerotic type. In view of her incapacity and liability to breakdown it was decided to operate on the assumption that her fibrillation was due to cardiac ischæmia. Just before operation examination showed some tachycardia, râles at both bases, and a blood pressure of 110–120 mm. systolic and 80 diastolic.

Thoracotomy was performed on June 25th. The phrenic nerve was not crushed. The pericardium was somewhat tense and the heart's action rapid and feeble. The pericardium was opened and a small quantity of aleuronat inserted. There were no pericardial adhesions, slight bleeding from a vessel on the heart surface was checked with a small piece of pectoral muscle. The blood pressure at the end of operation was 80 mm. systolic and 50 diastolic. There was a tachycardia reaching 184 per min. on the second day but the condition responded well to digitalis. Leucocytosis occurred and reached a maximum of 24,400 per c.mm. on the seventh day. An electrocardiogram taken immediately after operation showed no change, but no further records were taken during the next fortnight. She had a return of palpitations and tachycardia at the beginning of August, but again responded well to digitalis. She was discharged home on Sept. 17th. A week later she was taking life easily at home, staying in bed half the day. She was not breathless on exertion but complained of a rapid thumping over the heart. The heart was fibrillating slowly when examined and its sounds were of good quality. There were a few râles at the left base. The blood pressure was 170 mm. systolic and 90 diastolic. She was still taking digit. fol. gr. 1 twice a day.

When last seen on Oct. 22nd she was complaining of breathlessness again during the past three weeks, and her doctor had put her back on digitalis. There was no œdema.

CASE 20

A printer's warehouseman, aged 64, was transferred to Lambeth Hospital on August 11th, 1937, from St. Olave's Hospital (L.C.C.) with the story that he had slowly become breathless on exertion two years before. He was told by his doctor it was heart trouble and was treated successfully with medicine. Six months before admission the symptom had returned, accompanied as before by swelling of the ankles. He could not walk now without being pulled up almost at once by a choking sensation across the upper part of the chest. There was no pain. He was a pipe-smoker and used to drinking ale and stout. He had never had rheumatic or scarlet fever. Twenty years ago he had begun to be troubled with a gastric ulcer, symptoms of which persisted until they were completely relieved by a gastro-enterostomy in 1924. There was no history of angina, heart trouble, or strokes in the family. He has a son and four daughters, all grown up.

Physical *examination* showed a well-nourished man of lean type. The right cornea was opaque, owing to an accident in infancy. The mouth was grossly septic. The apex-beat was in the 6th intercostal space, 4½ in. from the midline. The heart sounds were accentuated but rather thin. Fibrillation was present and there was a systolic murmur at the apex. The blood pressure was 164 mm. systolic and 84 diastolic. There was marked radial and brachial arterio-sclerosis, and some overfilling of the anterior thoracic veins. A few râles were heard at the bases. The circumference of the chest measured 32½ in. in expiration and 34 in inspiration. The abdomen was rotund. There was a well-healed midline scar. The liver was not palpable. Nothing abnormal was found in the central nervous system. There was slight œdema of the ankles. The left leg showed varicose veins and the pigmented scars of two ulcers. The urine and kidney function tests were normal. The blood-urea was 36 mg. per 100 c.cm. The blood was normal and the Wassermann reaction negative. X ray examination showed an enormous heart. The electrocardiogram showed auricular fibrillation and inversion of the T waves in all leads. There was no axis-deviation. The œdema disappeared after a few days in bed. All his teeth were extracted on August 24th.

Thoracotomy was performed on August 27th and the phrenic nerve crushed. The heart was so enormous that the diaphragm could not be exposed enough for omentopexy to be carried out. The pericardium was opened and the coronary artery could be seen exposed and thickened but not tortuous. Aleuronat was inserted and the left lung sutured to the anterior edge of the cut pericardium. The pulse-rate at the end of operation was 88. He developed bronchitis with mild pyrexia which lasted a week. There was a leucocytosis of 34,800 per c.mm. Signs of collapse were present at the left base During the third week he developed considerable œdema of the legs, which responded well to Digoxin. The blood pressure rose gradually to its pre-operative level. He was allowed up, but by Oct. 8th œdema had returned, involving the legs and lumbar region. There was no tachycardia and he was well digitalised so injections of salyrgan were given every other day with good effect. He has been discharged home, is free of œdema, and able to get up daily without symptoms.

To sum up, in these five cases of non-anginal cardiac ischæmia submitted to operation we record one death. All five were chronic invalids. One is now leading a life of normal activity, one is improved, and the remaining two have recently been discharged from hospital and are no longer confined to bed.

Discussion

It might be as well to preface any discussion of the surgical treatment of angina pectoris with a brief consideration of the anginal patient's lot and what purely medical measures can do to alleviate it.

From Heberden's day "angina pectoris" has been the name given to a symptom-complex the peculiar feature of which is the possibility of sudden death; modern research has shown that its cause is defective coronary circulation. From the first attack the victim's activity is curtailed, to the particular disgust of the active type of person most prone to angina, and that curtailment is usually progressive. In severe cases fear of the next attack with its agonising pain weighs heavier than the "angor animi" which accompanies one. Prognosis is impossible. "The cardinal fact in real angina is its uncertainty" (Walshe, quoted by Osler 1925). Approximately half of the series published by Levine and Eppinger (1934) died suddenly. The disease marches inexorably, for the pathological condition underlying it is defective coronary circulation due to changes in the coronary tree which are irreversible and progressive. Clearly its progress cannot be arrested by physic, and this remark is most true of that catastrophe which awaits every victim of angina—coronary thrombosis. So far from being able to avert this often fatal complication, the physician may sometimes hasten it by his most valuable method of treatment, rest in bed. It must not be thought that nothing can be done to

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alleviate the disease. Much can be achieved by skilful management, which would include avoidance of the factors which precipitate pain (such as emotional stress, undue exertion, heavy meals, or exposure to cold), reduction of the patient's weight, and the use of nitrites for individual paroxysms. But granted the value of such measures as these, it must be repeated that they can only alleviate angina, and avail not either to attack its underlying cause or to postpone the catastrophe of coronary thrombosis. Medicine, in short, can do much to lighten the lot but little to alter the prognosis of the patient with coronary disease.

Our initial attempts at the surgical treatment of cardiac ischæmia were not embarked on without some misgiving. It appeared as if an operation might be too severe for those in the last stages of angina pectoris to endure and too severe for those in the earlier stages to contemplate. Actually, bedridden patients have displayed no immediate distress after the full operation of cardio-omentopexy. Diaphragmatic hernia was naturally considered as a possible complication of cardio-omentopexy, but we have not seen it in man, it has not occurred in the greyhounds which were subjected to great physical strain after their operation, and we do not now believe it to be a serious danger.

SELECTION FOR OPERATION

In the selection of patients two criteria were considered essential: unequivocal evidence of cardiac ischæmia and fitness for operation.

1. *Evidence of cardiac ischæmia* was sought in the patient's history and in the clinical, electrocardiographical, and radiographic findings.

Angina of effort—that is, cardiac pain which bears a direct relationship to exertion—is pre-eminent among symptoms, which include also attacks of painless dyspnœa, retrosternal oppression, or pulmonary œdema. The patient's daily consumption of nitroglycerin tablets provides a useful indication of the amount of pain. Clinically, importance was attached to gallop rhythm, pulsus alternans, or progressive fall of blood pressure. Not represented in this series but of great significance would be specific aortitis associated with anginal pain. In the electrocardiogram findings of value are disturbances of conduction as evidenced by lengthening or gross notching of Q R S and by bundle-branch block, flattening or inversion of T, alteration in the S–T interval, and presence of a Q wave in lead III. Lead IV was taken in every case, the technique advocated by Willcox and Lovibond (1937) being used and the left-arm electrode being applied over the fourth intercostal space because the apex-beat is not available while the operation wound is healing. Radiographically, the size of the heart affords little help, whereas demonstration of a cardiac aneurysm or of calcification of the coronary arteries is conclusive. The fact of coronary thrombosis, although constituting proof of coronary artery disease, was not considered enough in itself to justify operation, in view of the possibility of natural repair and revascularisation by the formation of pericardial adhesions. But a history of previous infarction in patients complaining of angina or breathlessness on exertion was held to strengthen the case for operation. It is our policy, therefore, to keep cases of coronary thrombosis under the strictest observation and to advise surgical intervention only if symptoms of cardiac ischæmia recur.

2. In assessing *fitness for operation*, age is the first consideration. Although our series includes a man of 72, it was thought inadvisable in most cases to suggest operation for patients over 65. This figure is no hard and fast limit, for often a young 70 will prove a better operative risk than an old 60, but, generally speaking, we operated on older patients only when relief from intolerable suffering was urgently demanded. In cases where pulmonary complications were feared, operation via Larrey's angle was available, a procedure which involves neither the pleural cavity nor the diaphragm and which can if necessary be performed under local anæsthesia. We have been impressed by the number of patients with angina who have rigid chests with poor respiratory movement, and our assessment of the chest condition has included measurement of the vital capacity and chest expansion. Breathing exercises have been found valuable, whether operation is to follow or not. In addition to standard radiograms a pre-operative radiogram taken in bed has been deemed advisable for more strict comparison with those taken in the early days after operation. Kidney function has been investigated in every case, but hypertension in itself has not been considered a contra-indication to operation.

TABLE III—PATIENTS INVESTIGATED BUT NOT OPERATED

Sex and age.	Diagnosis.	Reason for non-intervention.	Result.
M. 58	Angina pectoris.	Chronic bronchitis, art. calcification.	Died suddenly in bed.
M. 48	"	Awaiting admission.	Died suddenly at wheel of car.
M. 54	"	Chronic bronchitis.	? In statu quo.
M. 53	"	Patient refused.	In statu quo.
M. 64	"	Nephro-sclerosis.	" "
M. 47	"	Chronic bronchitis.	" "
M. 39	"	Gangrene of foot.	" "
F. 60	"	Nephro-sclerosis.	Died in uræmia.
F. 65	"	Patient refused.	Died suddenly in bed.
F. 73	"	Age.	In statu quo.
F. 64	"	Diabetes.	" "
M. 77	Coronary thrombosis.	Acute stage.	Died.
M. 74	"	" "	"
M. 71	"	" "	"
M. 53	"	Symptom-free.	Under observation.
M. 65	"	" "	" "
M. 64	"	" "	" "
M. 55	"	Patient refused.	Breathless on exertion.
F. 71	"	Acute stage.	Died.
F. 64	"	Symptom-free.	Under observation.

Details of the cases which were investigated with a view to operation but in which operation was not carried out appear in Table III. It will be seen that 40 per cent. of the patients have died, a fact which shows only too clearly the appalling mortality from coronary disease; of the survivors those recovering from an attack of coronary thrombosis are potential subjects for operation.

THE OPERATION AND ITS SEQUELS

The operation itself brought out many points of interest. The omentum presented readily in every case, when the diaphragm was incised, often in spite of previous laparotomies. It was possible to study the pathology of the living heart and pericardium. The inferior sternopericardial ligament is a far more striking structure during life than when seen post

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mortem, and this is true also of the tenseness of the pericardium over the hypertrophied heart, when it may be as difficult to pick up and incise as is the dura mater over an œdematous brain. An exception to this was seen in Case 6, where the heart was greatly hypertrophied owing to a congenital lesion, but the pericardium was not tense. It is suggested that in congenital cases, where heart and pericardium "grow up" together, pericardial tension will not be found. We learnt to distrust a heart in which the myocardium is grey-yellow in colour, or where the left descending coronary artery is tortuous and exposed (Case 7).

The post-operative course was fortunately smooth in most cases. Post-operative shock, which would be a serious complication in the angina group with its threat of initiating a coronary thrombosis, was not observed. In Case 10 there was a reactionary hæmorrhage which required no special treatment. Signs of collapse at the left base were found in every case in which the diaphragm was paralysed and mild purulent bronchitis was of frequent occurrence. The diaphragm takes 4–6 months to recover and movement returns before tone. Fever (Fig. 6) and a well-marked leucocytosis occurred, especially when aleuronat was used, and in the latter case pericardial friction was usually heard. The electrocardiographic changes will be discussed in detail in a later paper. No change was recorded immediately after operation, which suggests that paralysis of the left diaphragm may produce no immediate axis-deviation. Aleuronat pericarditis as might be expected was associated with elevation of the S–T interval (Fig. 5, arrow) especially marked in lead II. In three or four weeks inversion of the T waves in leads I and II commonly occurred (Fig. 5), a change we interpret as indicating a myocardial reaction comparable with that seen in the T_1 type of coronary thrombosis. Paroxysmal auricular fibrillation was recorded in Cases 4 and 5 (Fig. 5), and responded readily to quinidine.

Results and Commentary

There have been six deaths in this series of twenty cases—one immediate, the others after periods varying from seven weeks to nine months. Details of the post-mortem findings are given in each case-history. The evidence obtained in Case 18 suggests that there is a degree of cardiac ischæmia incapable of relief by surgical means. Case 7 was probably of this type, but the association of a normal aorta and renal vessels with advanced coronary disease might indicate that at a rather earlier date revascularisation could have been effective. In Case 14 there was no post-mortem examination, but it seems likely that the cause of death seven weeks after the operation, with a wound soundly healed, was related to the cardiac arrhythmia rather than the operation.

From consideration of our fourteen surviving patients it will be seen that all those who have survived operation for six months or longer are better, and most of them symptom-free. In Group I (Table I) Case 1 is free of pain, and has been restored at the age of 65 from a life of invalidism to one of full activity. Case 4, who was confined to bed and prevented by pain from washing herself, is now leading a normal life at the age of 66. Case 5 could not mount more than five steps without bringing on an attack; he now climbs sixty stairs to his room without pain. Cases 8, 11, and 13 have returned to work. Case 9 had been compelled to sell his car, and move from a house to a bungalow in order to avoid stairs; since his operation he has moved back into a house and is driving a car again. Case 10 has to climb seventy-two stairs daily to his office. Before his operation he was forced to stop frequently on the stairs as well as on each landing, and used to reach the top in considerable distress. He can now climb them without pain or discomfort, though he still stops on each landing as a precaution. The same patient consumed before his operation 48 tablets of trinitrini a week; now he has ceased taking this drug. Case 15 was still confined to bed owing to angina nearly a year after a coronary thrombosis; now at the age of 65 she is at a convalescent hospital, free of pain, and able to get up for two or three hours a day. In Group II (Table II) Case 3 lost her gallop rhythm and pulsus alternans, which had been present for five months, a month after operation and is now fully active. X ray examination shows a return of her heart shadow to normal size (Fig. 9). Case 6 had no further Stokes-Adams attacks after his operation, and, until his fatal illness, was no longer confined to bed but attending to his business. Case 12, since her operation, has had no further attacks of failure and her clinical condition is better.

As we would have assumed from the experimental evidence, improvement increases with time. The patients who were improved six months after their operation are still better six months later.

The present communication does not claim to prove that surgery offers an unfailing cure for angina but only to support the original contention (O'Shaughnessy 1937) that operation is feasible and attended with a low immediate mortality. We realise that for final justification the operation must be shown to have improved the prognosis in a large series of angina cases, and since it has been established by numerous studies on the prognosis of this disease (Levine and Eppinger 1934) that the expectation of life from the date of the first paroxysm is just under five years, we have clearly many years to wait for the acid test. Nevertheless, now that we have indisputable experimental and pathological evidence that revascularisation of the heart can be induced in man, we feel that application of the principle so established to a proportion of that enormous group of patients who are suffering from a deficient blood-supply to the heart is justified.

Summary

Initial experiences are reported with the treatment of coronary disease by cardio-omentopexy.

The types of cardiac ischæmia and the mechanisms of natural compensation are briefly described.

The experimental basis of cardio-omentopexy and allied operations is reviewed.

The cases, 20 in number,* are considered in two groups: 15 suffering from angina pectoris and 5 from other symptoms of cardiac ischæmia. Of the first group, 5 died, while 8 of the remaining 10 are free of angina. In the second group there was 1 death and 1 is free of symptoms.

Discussion is devoted to the limitations of medical treatment, the selection of patients for operation, and the points which have arisen from the operation itself and the post-operative course of the patients.

Details are given of a further 20 cases which were investigated with a view to operation but in which operation was not carried out. Of this group 8 have already died.

The results are analysed in detail. It is claimed that the experimental, pathological, and clinical evidence justifies the application of cardio-omentopexy

*This series does not include the first case of cardio-omentopexy performed at Lewisham Hospital (L.C.C.) on Jan. 4th, 1936, cases operated on in the Lambeth Cardiovascular Clinic since Sept. 1st, 1937, and cases operated on elsewhere.

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to a proportion of patients suffering from defective coronary circulation.

We have many acknowledgments to make, one of us (L. O'S.) to the Medical Research Council from whom he receives a personal grant. We are grateful to Dr. Geoffrey Konstam, who referred some cases to us for operation and joined us in consultation on them. We wish to thank also the many practitioners who have been kind enough to send us patients, and the medical superintendents of Lewisham, St. Olave's, and St. Stephen's Hospitals (L.C.C.) for transferring cases to the Clinic. For personal coöperation we are indebted to Dr. J. K. Hasler, our consultant anæsthetist, to Mr. David Slome and Dr. Philip Berry for surgical assistance, to Dr. T. McK. Robb for technical help, to Dr. W. G. Barnard and Dr. R. F. L. Hewlett for all the pathological work, and finally to Dr. P. J. Watkin, medical superintendent of Lambeth Hospital, and Mr. G. F. Stebbing, its surgeon specialist, for their ready help and advice. In conclusion, we are deeply grateful to Sir Frederick Menzies, medical officer of health for the County of London, for his constant encouragement and for permission to publish these cases.

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TRANSFUSION OF BLOOD AND OTHER FLUIDS IN INFANCY

BY GEORGE ORMISTON, M.D., M.R.C.P. Edin.

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THE parenteral administration of various fluids has been increasingly in vogue since the importance of the replacement of body water and salts in conditions leading to dehydration, and the value of dextrose in certain states of intoxication, have been realised.

Dehydration and anhydræmia are particularly common in infancy as the result of infections leading to vomiting or diarrhœa or both. Such infections are: (1) upper respiratory, including otitis media and mastoiditis; (2) intestinal per se, including intestinal intoxication (cholera infantum) and dysentery; (3) renal tract (pyelitis, pyelonephritis); and (4) meningitis. Dehydration of some degree also takes place wherever there is failure to ingest food and fluid beyond a limited period, and in all conditions leading to gastric and intestinal obstruction (pyloric stenosis, intussusception).

Dehydration and anhydræmia are accompanied by disturbance of the acid-base balance of the body, resulting in acidosis and ketosis, or alkalosis, manifest or non-manifest clinically. In addition, where infections are unduly prolonged, there is a slow destruction of serum protein and erythrocytes.

The replacement of body fluids and salts is therefore strongly indicated and may be life-saving. The routes employed for this replacement in infancy are the subcutaneous, the intraperitoneal, and the intravenous. These routes may be used singly or in combination. The first two are adequate for the treatment of milder dehydration. Aside from the transfusion of blood or serum, the last is particularly valuable in anhydræmia where rapid restoration of the blood volume is needed. Further, dextrose may be given intravenously in concentrations that are highly irritating to the subcutaneous or intraperitoneal tissues.

Intravenous technique as applied to adults has been adequately described. A Wassermann-size needle is used, or the vein cut down on and a cannula inserted. The veins of the infant, however, are small, movable, less distinguishable, and mostly unsuited to the employment of the standard needle. Repeated transfusions may be necessary in long-continued infections, and the frequency with which the cutting operation may be done is limited. The sagittal sinus provides an easy and reasonably safe site for the introduction of fluids. Its disadvantages are that it cannot be used for continuous administration, and that, unless in exceptional circumstances, it ought not be to used for the transfusion of blood owing to the dire results of error, whereby blood is injected on to the surface of the brain.

THE TECHNIQUE RECOMMENDED

The following method is used with success in the Princess Louise Kensington Children's Hospital for the transfusion of blood in infants, and for the intermittent and continuous transfusion of fluids.

A 500 c.cm. Florence flask is fitted with a two-holed rubber stopper and appropriate glass tubing. To the shorter tube is attached about four feet of rubber tubing, the other end of which is joined to a three-way stopcock for the transfusion of a single quantity of fluid, otherwise to a metal adapter for insertion into the base of a hypodermic needle (Nos. 16–18), if continuous intravenous administration is required (Fig. 1).

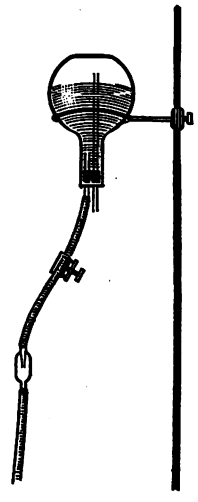

FIG. 1.—Flask containing fluid to be transfused, showing position, with rubber tubing, box-screw clip and Murphy drip.

For transfusion purposes, a hypodermic needle and a 10 c.cm. all-glass syringe (with nozzle to fit a Record needle) are fixed to the three-way stopcock (Fig. 2). The Florence flask is filled, inverted, and placed on the right of the operator about three feet above the patient. The former should sit in a comfortable position facing the top of the infant's head.

The infant is wrapped securely in a sheet or blanket to prevent movement of the arms or legs, and laid supine across the cot. The nurse secures complete immobility by placing her elbows and forearms alongside the body of the infant, grasping the face and head firmly with both hands. The head should be turned flat on the side. The side uppermost is shaven clean over an area extending back as far as the posterior margin of the ear, and up as far as the junction of the top and side of the cranium. This area is then sterilised with iodine and alcohol.

The superficial temporal vein and its frontal and parietal tributaries are identified. These veins are

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often hard to make out when the patient is anhydræmic, but they can be brought up by gentle slapping or stroking with a cotton-wool swab. It helps to make the vein stand up if the forefinger is placed on the zygomatic arch.

Ten c.cm. of the fluid in the flask is drawn into the syringe. The stopcock is adjusted for outflow through the needle, which is now threaded to its full length

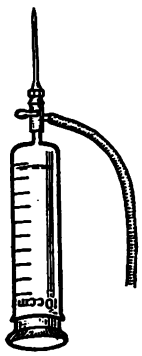

FIG. 2. — Transfusion of citrated blood through hypodermic needle, using 10 c.cm. syringe and three-way stopcock.

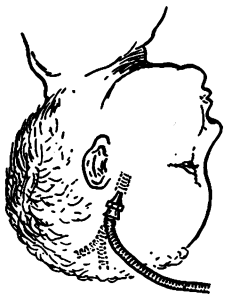

FIG. 3. — Hypodermic needle in superficial temporal vein; rubber tubing with metal adapter attached.

into the vein (Fig. 3). No attempt should be made to draw blood back into the syringe, for the bore of the needle is too small to permit this. Instead, pressure should be applied to the barrel of the syringe, and if the vein has been entered, the inflow is free and easy, whereas failure results in a subcutaneous injection and the immediate appearance of a lump, at which the needle should be completely withdrawn and the attempt repeated, using the same vein at a more proximal point, or else another vein altogether.

For the continuous administration of fluid, the needle is first attached to a 2 c.cm. all-glass syringe filled with saline, and the vein entered as before. The injection of a small quantity of saline reveals the position of the needle, from which, if in the vein, the syringe is gently disengaged and replaced by the rubber tubing with adapter. The system should be filled and a drop flow permitted before the above manipulations, so that interruption of the flow through the needle should be as short as possible. The rate of flow is controlled by the use of a Murphy drip and a box-screw clip interposed between the flask and adapter.

Once the adapter is connected, it is held in position by a cotton-collodion mould. Small pads of cotton-wool are impregnated with collodion and pressed against the head of the needle and the adapter and the adjacent rubber tubing till dry. The needle is thereby kept in alignment, and the position further stabilised by strapping the collodion pads and tubing to the head with adhesive. The whole operation requires delicacy and care, but if it is successful the fluid will run for 24–48 hours without further attention except as regards regulation of flow. It is seldom that the flow will continue beyond this period. If further continuous administration is desirable, the collodion and adhesive should be softened with acetone and taken off, and the needle withdrawn. The other side of the head should now be used, or else the veins in other situations, such as the ankle veins.

It should be noted that a small area round the needle is apt to become œdematous within a few hours. The œdema is purely local; it is in the nature of a reaction to the presence of a foreign body and is without significance so long as the flow is unimpeded. Unless this is recognised, the inexperienced operator is likely to disconnect the apparatus under the impression that the needle is out of the vein and the fluid getting into the tissues.

CONCLUSIONS

The advantages of the above method are: (1) It is safe. A hypodermic needle causes a minimum of trauma and is never followed by local infection if the usual sterilisation precautions are taken. (2) It causes a minimum of disturbance and shock to the infant. (3) Many veins are available to the small needle used. (4) Where blood is transfused the introduction of a clot is virtually impossible, and (5) the rate of inflow is limited so that there is no danger of pulmonary œdema or cardiac embarrassment from too rapid an injection.

The disadvantage is that the acquisition of the technique requires time and patience and a good deal of practice.

Clinical and Laboratory Notes

A CASE OF AGRANULOCYTOSIS

BY E. HOWARD KITCHING, M.D. Leeds, D.P.M.
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Boyd (1935) recognises three forms of agranulocytosis: (1) a primary form of unknown ætiology; (2) malignant leucopenia of bacterial origin as in pneumonia or osteomyelitis; and (3) a malignant leucopenia caused by benzol, arsenical preparations and certain analgesic and antipyretic drugs (e.g., amidopyrine) which possesses the benzene ring in their molecule. The following case apparently belongs to the first group.

The patient, a man of 23, was admitted to hospital on July 3rd, 1936, with dementia præcox. He was well nourished and apart from several carious teeth showed no abnormal physical signs. Mentally he was dull, morose and apathetic; he had the typical mannerisms of dementia præcox and smiled and giggled foolishly; he talked to himself and was negativistic though he took food fairly readily. His weight was 7 st. 10 lb. He had had no previous illnesses other than a minor accident when aged 5 and had been employed as a labourer since leaving school until the onset of his mental illness two years before admission to hospital. His father and mother were both living and healthy.

After admission his teeth were attended to by the visiting dental surgeon. He ate well and his weight increased to 9 st. 1 lb. His mental condition showed no change but in November, 1936, he became noisy, excited, and impulsive, and a mixture containing sodium barbitone, grains 5 t.d.s., was prescribed on Nov. 9th, 1936. On Feb. 12th, 1937, the dose of sodium barbitone was reduced to gr. 5 b.d., and he continued to take this up to the onset of his present illness on Oct. 28th. In June, 1937, he was given a sulphur and calamine lotion for acne on the back, and this was used for a month.

On Oct. 28th the patient complained vaguely of abdominal pain. At this time he was almost in a state of stupor; he could give no account of himself, and merely put his hand on his abdomen and said "pain." No further history could be taken, for he would not answer any more questions. His temperature was 101·6° F. and his pulse rapid. No physical signs could be found in any system. His throat appeared healthy. There were no signs in the chest, no abdominal tenderness, and no signs of meningeal irritation. The possibility of appendicitis was considered, and he was given an enema. Four hours later the temperature was 105°, the pulse-rate 137, and the respirations 20. He did not appear to be in any distress, and when asked if he had pain said "No." He was kept under close observation. The next day, Oct. 29th, he had a relaxed stool and was incontinent. The stool was fluid, small, and contained no blood, mucus, or pus. The temperature was 104·8°, the pulse-rate 142, and the

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respirations 28. There were still no physical signs other than a very slight fullness in the right loin without any local tenderness or rigidity. The urine was normal. A blood count now showed :—

			%
Red cells	5,410,000	Polymorphs	33
White cells	3,000	Small lymphocytes ..	56
Hæmoglobin ..	100 %	Large lymphocytes ..	6
Colour-index ..	0·92	Monocytes	5
Diameter of red cells	7·4μ		

A few normoblasts were present, a few red cells showing basophilic granular degeneration, and a few poikilocytes. No abnormal white cells to be seen.

A blood culture was also made and was sterile.

A diagnosis of agranulocytosis was made and he was given Pentnucleotide 10 c.cm. intramuscularly. On Oct. 30th his condition appeared worse. The temperature was 104°, the pulse-rate 160, and the respirations 28–36. Slight cyanosis appeared in the face. There was little sweating. He did not complain and again there were no physical signs. The throat still appeared healthy; there were a few sordes on the lips. Throughout the day he was incontinent of urine and fæces. Pentnucleotide 10 c.cm. was given intramuscularly in the morning and intravenously in the evening. Also he had two injections of Digitalin gr. 1/100 and strychnine gr. 1/60.

Blood counts at 9 A.M. and 3 P.M. were :—

	Red cells	White cells	Polymorphs %	Lymphocytes %	Monocytes %
9 A.M...	—	1800	10·5	88·5	1
3 P.M...	4,500,000	400	11	88	1

A few normoblasts were present, and a few red cells showed punctate basophilia. Again there were no abnormal forms of white cells.

At 2 P.M. on Oct. 31st the pulse became so rapid that it could not be counted and he died.

Throughout the course of this fulminating illness, which strongly resembled a septicæmia, there were no hæmorrhages into skin or mucous membranes and the spleen was never palpable.

Post-mortem findings.—It was in the intestines that the only striking abnormality was found. The small intestine showed no change, but the colon was the seat of an extensive necrotic process which appeared to involve only the mucosa. There were several large necrotic patches principally in the transverse and descending colon but also in the ascending part. These patches were covered with greenish-grey debris. Around them there was no inflammatory reaction. The serous coat appeared quite normal. Cultures were made from these patches and showed only the normal intestinal flora. There were no non-lactose-fermenting organisms and no spirochætes.

All other organs were normal in size, colour, consistency, and on section. A portion of bone-marrow was taken from the sternum, and was normal to the naked eye. Smears showed myelocytes and some lymphocytes. No polymorphonuclear leucocytes were to be seen. The myelocytes contained abundant well-staining granules.

This appears to be a case of primary agranulocytosis as distinct from the malignant neutropenia associated with severe infections. The absence of ulcerative lesions in the throat or rectum is a point of interest, especially as a necrotic lesion was found in the colon. A necrotic process of this kind may involve the œsophagus, stomach, or bowel, and is sometimes regarded as primary (McCrae 1935). Another unusual feature is the presence of nucleated blood-cells in the blood films. These were only seen in small numbers, but their presence is noteworthy for they are usually not to be found at all.

Kracke and Parker (1933, 1934) have presented evidence that agranulocytosis may be caused by certain drugs, containing a benzene ring with an attached NH_2 group. The only drug this patient had had was sodium barbitone which possesses no benzene ring and no isolated NH_2 group in its molecule. Available evidence is strongly against such a barbiturate causing the condition, although when barbiturates have been employed in conjunction with amidopyrine they have been said to have an adjuvant effect in producing it. In this case the barbitone was not used in any such combination and it seems unlikely that any causal relationship can be established.

I am indebted to Dr. N. Moulson, medical superintendent, Cefn Coed Hospital, Swansea, for permission to report this case, and to Mr. A. Dignam, laboratory technician at the hospital, for the laboratory investigations.

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BALANTIDIAL DYSENTERY

By D. L. Mackenzie, M.B. Glasg., D.P.M.
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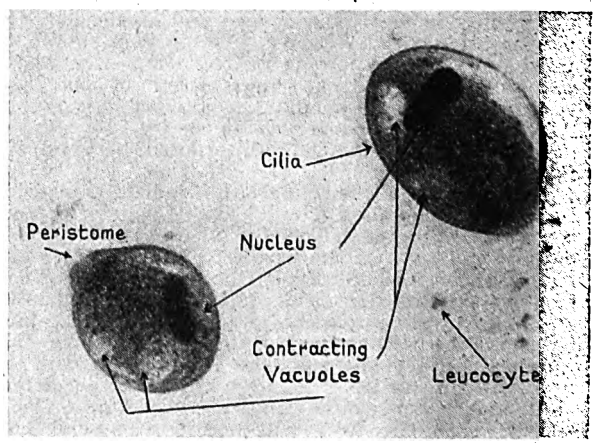
H. Bean
CHIEF LABORATORY TECHNICIAN AT THE HOSPITAL

Balantidial dysentery in man, or balantidiosis, is such an uncommon disease that we feel justified in reporting the following case, which, as far as we are aware, is the first recorded in Great Britain.

Before doing so, however, we would like to give a short description of the infecting organism—*Balantidium coli*. First described by Malmsten in 1856, it is a natural parasite of the pig, in which it is apparently harmless. It is a ciliated protozoon, being the largest protozoon and the commonest of the intestinal ciliates found in man. Its length varies from 30 to 200μ and its breadth from 20 to 120μ, the average size being about 70 by 50μ. It is oval, and has a visible mouth or peristome at the anterior end, a large kidney-shaped nucleus, and two large

FIG. 1



contracting vacuoles. It is completely covered with cilia, which are slightly elongated in the region of the mouth. It rotates in the process of swimming and alters shape readily when in contact with surrounding fæcal matter, particles of which form the organism's main food-supply. *Balantidium coli* multiplies by transverse fission into two daughter protozoa and encysts in the intestine. The cysts, which are passed out in the fæces, are rounded, have a fairly thick wall, and measure between 50 and 60μ in diameter. Each cyst gives rise to only one ciliate. The unencysted organisms are very sensitive and soon die if passed

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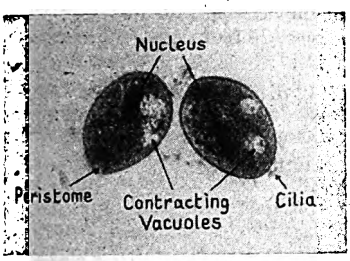
in fæces, but the cysts can live for several weeks if kept moist.

Man is probably infected from the pig, either directly by eating diseased flesh, or indirectly by contact with pig's fæces or contaminated water. Encystment takes place in the large intestine, and the infection is usually limited to this part of the gut, particularly the cæcal end. The lesions found in the intestine are similar to those found in amœbic dysentery (Blacklock and Southwell 1931).

The patient, a well-nourished female aged 31, in good general health, was admitted to the County Mental Hospital, Rainhill, on Jan. 22nd, 1936. Mentally she presented the typical picture of the katatonic variety of schizophrenia, and since admission she has progressively demented.

FIG. 2



On June 9th, 1937, she was confined to bed with frequent loose stools, but apart from a moderate quickening of the pulse-rate showed no other signs of physical disturbance. Owing to her mental state coöperation was impossible, but she did not appear to have any abdominal discomfort. A blood film examined at this stage showed a relative increase of mononuclear leucocytes but nothing else abnormal. The stools were clay-coloured and contained much mucus and pus, but culture media yielded only the colon group. Smears examined with the microscope revealed large oval organisms darting in and out of the field, propelled by cilia, and moving in a rotary manner. Others exhibited a simple rolling movement, while some, seen imbibing small particles of fæcal matter through the peristome, were stationary. The latter, examined under high power, showed the features characteristic of *Balantidium coli* (Figs. 1 and 2). On one occasion division into two daughter cells by fission was noted.

With treatment (see below) the patient's symptoms gradually cleared up, and, for four months now, no balantidia or balantidial cysts have been detected either in her stools or on rectal swabs.

Dobell and O'Connor (1921) after a survey of the literature could find no specific cure for the disease, but Cort (1928) claimed success with enemata of oil of chenopodium (15 c.cm. in 150 c.cm. of olive oil), and Banik (1935) reports a case treated successfully with Yatren enemas (8 oz. of 2·5 per cent. solution).

Our patient was given an appropriate diet, an astringent mixture, and Chinosol, with no great effect on the parasites. It was noted, however, in the laboratory, while attempting to stain the organisms, intra vitam, with Löffler's methylene-blue, that as they ingested the dye, movement became sluggish and within 10–15 minutes ceased, and they spontaneously disrupted. On this observation it was decided to use the dye in treatment. On June 23rd the lower bowel was thoroughly washed out and 2 pints of Löffler's methylene-blue was slowly run in. This was retained by the patient for two and a half hours and was followed by another washout. The whole procedure was repeated next day. Samples of stools and smears from rectal swabs examined at regular intervals after this revealed no vegetative forms of the organism and a gradually diminishing number of cysts until on July 7th only an occasional degenerated cyst was detected. On July 8th a further washout was given, followed by an injection of dye, and since then neither ciliates nor cysts have been discovered.

The origin of the infection in this case cannot ascertained. It is difficult to obtain accurate inform tion about the patient's history, but according to h husband she was born in Liverpool and has spe all her life there. She has never lived on a farm had any contact with pigs; nor was she particular fond of pork.

We have to thank Mr. T. Southwell, D.Sc., of t Liverpool School of Tropical Medicine, for confirming diagnosis of the organism, and Dr. E. F. Reeve, medi superintendent of the hospital, for permission to publ the case.

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SUCTION ELECTRODE FOR ELECTRO-CARDIOGRAPHY
ESPECIALLY IN CHEST LEADS

BY S. VATCHER, M.D. Camb.
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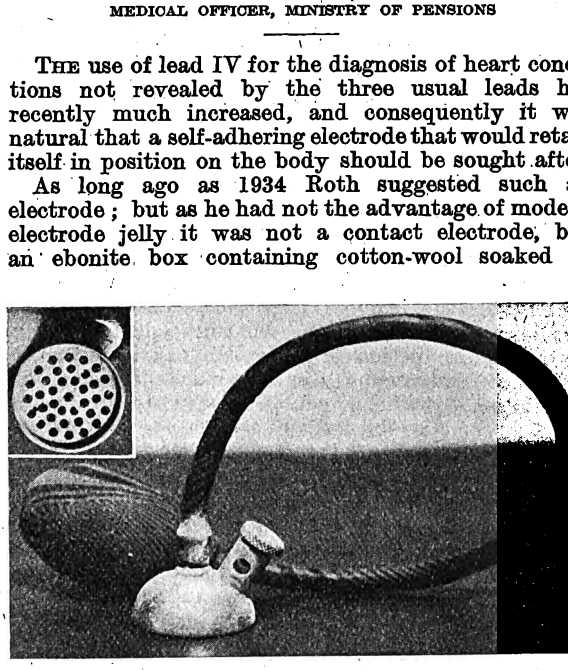
THE use of lead IV for the diagnosis of heart conc tions not revealed by the three usual leads h recently much increased, and consequently it w natural that a self-adhering electrode that would reta itself in position on the body should be sought aft

As long ago as 1934 Roth suggested such electrode; but as he had not the advantage of mode electrode jelly it was not a contact electrode, b an ebonite box containing cotton-wool soaked



The suction electrode, with rubber bulb attached. Inse shows cribriform metal plate for contact with skin.

saline and retained by a vacuum. It was ve complicated, involving ten separate operations befo use, which probably accounts for the fact that it h not been generally adopted. Holzmann in 19 described a suction electrode for use with a lin pad soaked in saline, but this again is rath complicated, being, I imagine, very expensive manufacture; it involves the use of a powerf vacuum pump, is said often to cause bruising or pa in application, and there is difficulty with thin hairy subjects. For use with electrode jelly, H (1937) advocates the use of a special electrode, shap like a button but otherwise resembling the usu Cambridge electrode. This however requires fixi to the chest wall by means of adhesive plaster a dirty and unpleasant procedure which involves so subsequent discomfort during removal, and whi does not produce a very intimate electrical contact.

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I have therefore designed a contact electrode, shown in the Figure, which retains itself in position by the suction produced by a partial vacuum.

It consists of a hollow bell, fitted with a terminal and a tube to which is attached a rubber bulb on the end of a rubber tube. Across the mouth of the bell is fitted a cribriform plate of the same metal (German silver) as the bell. (The appliance may be obtained from the Cambridge Instrument Company.)

The skin is cleaned in the usual manner with Cambridge electrode jelly, and a thin layer of jelly left on the surface. The rubber bulb is then squeezed and the mouth of the bell placed in contact with the chest. The bulb is released, and the electrode will be found to retain itself in position, the skin being forcibly drawn against the cribriform plate, resulting in an intimate electrical contact. The appropriate lead is then connected to the terminal and the electrocardiogram taken.

Cleaning is effected by squeezing the bulb several times while the instrument is immersed in water, and then drying.

So successful did this prove with chest leads that I now apply the same principle to the ordinary limb leads; I understand that with young children the much smaller size of electrode (which is possible because of the far superior electrical contact) is a great advantage, as the ordinary Cambridge pattern is very cumbrous for use in these cases. In very hairy subjects shaving the chest may be necessary for chest leads, but I find that in the majority hair is absent from the skin just below the nipple. In very emaciated subjects it might prove difficult to obtain a suitable flat surface to which to apply the electrode, but this difficulty must apply equally to any form of contact electrode. I personally have not yet met a case that presented either of these difficulties.

I invariably use Roth's (1935) method, leaving the right-arm lead on the right arm; after taking the ordinary three leads, all that is necessary is to transfer the suction electrode from the left arm to the cardiac apex for lead IV.

I wish to thank the director-general of medical services at the Ministry of Pensions for permission to publish this description.

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MEDICAL SOCIETIES

LIVERPOOL MEDICAL INSTITUTION

A MEETING of this society was held on Dec. 16th with Dr. R. E. ROBERTS, vice-president, in the chair. Reading a paper on

Gastroscopy

Mr. J. HOWELL HUGHES said that the method, which had been first introduced in 1868, had fallen into disuse with the introduction of the barium meal for radiological investigation, but now had returned with the production of a flexible instrument. The value of gastroscopy was summarised under four headings: (1) Ulcers could be divided into acute, chronic, and a third type associated with stomal ulceration and termed subacute. Gastroscopy was useful in cases of doubt whether the ulcer was simple or malignant, and in judging the response of an ulcer to treatment—absence of a crater by radiological investigation did not mean complete healing. The extent of chronic gastritis associated with duodenal ulcer could be seen and also whether pylorospasm was due to disease of the stomach or was reflex in origin. (2) In cases of neoplasm, gastroscopy would show the extent of invasion, which was usually greater than radiography suggested. (3) In gastritis one could recognise four main types: acute, chronic hypertrophic, specific, and atrophic. The type and activity could only be determined by gastroscopy. (4) After operation the presence of active gastrojejunitis or acute anastomotic ulcer could be confidently diagnosed. The Wolf-Schindler gastroscope and the technique of the examination with the appearances were described with the aid of a film and slides.

Dr. E. L. RUBIN said that the radiological sign of rigidity of a portion of the stomach wall did not always imply extensive malignant invasion of the stomach. This sign, which was strong presumptive evidence of malignancy, was sometimes found beside an ulcer in which evidence of malignant disease was provided only by microscopic examination and where the adjacent stomach wall looked and felt normal at operation. He wondered if the gastroscope could furnish evidence of malignant disease in these cases of mural rigidity without any demonstrable macroscopic lesion.

Femoral Embolectomy

Mr. E. N. WARDLE read a paper in which he traced the history of embolectomy from Suabanejeu's first attempt in 1895. The first success recorded was that of Labey in 1911, and this again was a femoral embolectomy. Key of Stockholm in 1923 collected 51 cases including 12 of his own. Jefferson of Manchester two years later added to this total. The condition usually occurred in patients with heart disease, but several cases had been observed in which this cause could not be found. Success depended largely on removal of the embolus within two hours of its lodgment.

A patient was then demonstrated upon whom Mr. Wardle had operated in November, 1936. The embolism occurred in the left femoral artery, nine days after an operation for an injury to the right ankle; at no time did the patient show any evidence of a cardiac lesion. Four days after its removal he had pain in the chest, but no definite signs of a pulmonary embolus were ever found. He had now a comparatively normal circulation in the leg, without any swelling, even after being on the limb all day.

The questions arose whether the femoral artery was now patent at the affected area and whether it would have been equally effective to tie the vessel above and below the site of lodgment of the embolus and its associated thrombus.

Mr. F. RONALD EDWARDS described three cases in which he had removed the embolus.

The first patient, who had heart disease, had an embolism in the third part of the axillary artery, which was successfully removed. The second had an embolism at the bifurcation of the brachial artery. Removal of the embolus was performed with recovery of the limb, but the patient died three weeks later from cardiac failure. Section of the sutured artery showed normal healing in the wall and the presence of a satisfactory lumen. In the third case, with sudden loss of radial and ulnar pulse, a clot was removed from the bifurcation of the brachial artery. The case, however, turned out to be one of arterial thrombosis, with gangrenous changes becoming manifest in the other limbs.

Brachial plexus block anæsthesia was used in all three cases.

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REVIEWS AND NOTICES OF BOOKS

Textbook of Ophthalmology

Vol. II. *Clinical methods of examination, congenital and developmental anomalies, general pathological and therapeutic considerations, diseases of the outer eye.* By Sir STEWART DUKE-ELDER, M.A., D.Sc. St. And., Ph.D. Lond., M.D., Ch.B., F.R.C.S., Surgeon Oculist to H.M. The King; Ophthalmic Surgeon, St. George's Hospital. London: Henry Kimpton. 1938. Pp. 1127–2094. 63*s*.

THE second of the four volumes that will make up this comprehensive work has now appeared after a long period of gestation, for its predecessor was published in 1932. This volume was however worth waiting for. It contains sections on the clinical methods of examining the eyes; congenital and developmental anomalies; and general pathological and therapeutic considerations about diseases of the eyes and diseases of the outer coats—the conjunctiva, cornea, and sclera. The description of the conduct of an ophthalmic examination by both simple and elaborate apparatus is especially lucid and concise. Some 15 pages are devoted to the application of the corneal microscope and slit-lamp to the examination of the anterior segment of the eye. In the section on ophthalmoscopy the author reviews certain methods for localisation in the fundus. Accurate localisation has much practical importance in the modern surgical treatment of retinal detachment, for it is essential to determine before operation the exact site of a retinal tear in relation to the overlying sclera; instruments designed for this purpose are here described. In the account of the main pathological groups in which diseases of the eye may be classified the discussions on metabolic disorders, viruses, allergy, and pigment distribution are of particular interest. This section is well placed in the book, preceding as it does that which describes diseases of the outer eye. The bacteriology of many types of conjunctivitis is fully examined and illustrated by some admirable photomicrographs borrowed largely from Lindner's collection. The section on trachoma is a masterly review of the history of this disorder, its endemiology, pathology, and ætiology. Many splendid coloured illustrations and photomicrographs show the clinical features, slit-lamp appearances, and histopathology of trachoma in its various stages. The references on this subject alone occupy double columns of print on four pages and are an example of the author's intensive research into the original sources of the work he summarises. Conveniently placed at the end of every subsection is a full bibliography, and it is evident that the author has not only noted but has assimilated the mass of material it represents. This work will bring credit to British ophthalmology.

The Hair and Scalp

Second edition. By AGNES SAVILL, M.A., M.D. Glasg., M.R.C.P.I., Consulting Physician, Fitzroy-square Skin Hospital; formerly Physician, St. John's Hospital for Skin Diseases. London: Edward Arnold and Co. 1937. Pp. 309. 12*s*. 6*d*.

SOME new paragraphs have been added and several sections have been rewritten, notably those on pigmentation, the sebaceous glands, and infantile eczema. The distinction between true infantile eczema, infantile seborrhœic dermatitis, and streptococcal dermatitis is made quite clear. The treatment of ringworm of the scalp by X ray epilation is discussed quite fully, but the doses are still referred to in terms of pastilles. The modern method of measuring X rays is in Röntgen units (r) with some form of iontoquantimeter; this enables the dose to be calculated with accuracy and the risk of patches of permanent baldness due to overdosage has thus been practically eliminated. Dr. Savill deals fully with that distressing complaint hirsuties and details the various methods of treatment available. She rightly condemns the use of X rays for this condition and points out the grave results that may follow their use. The electrolysis and diathermy methods of epilation are fully described; perhaps too much space has been devoted to the former method, as diathermy is so much quicker and more satisfactory in every way, that it is only a question of time before electrolysis is discarded for this purpose. The suggestion made in our previous notice of the book that the prescriptions should be written in a more uniform manner has been adopted. The book contains much information which not only dermatologists but others interested in the hair and scalp will find useful.

Principles and Practice of Rectal Surgery

Second edition. By WILLIAM B. GABRIEL, M.S., F.R.C.S., Surgeon to St. Mark's Hospital and the Royal Northern Hospital. London: H. K. Lewis. 1937. Pp. 363. 28*s*.

THIS is a book which has already filled with distinction a vacant place in surgical literature. Now it has been so extensively revised and rewritten as to be almost a new book providing one of the best accounts of rectal surgery in the English language. It has the merit of being complete, yet not too long; it is practical, up to date, and rational in outlook. The teaching is that accepted by most proctologists, and our only adverse comment is that in just a few places a little more information might have been given. There is, for example, no account of operations upon the sphincters for prolapse of the rectum, nor any reference to the work of Westhues and Schmieden on the spread of cancer. These researches have importance in that they show Miles's insistence on the necessity for removal of the lower extremity of the bowel and the tissues in the ischiorectal fossa to be too sweeping; they provide the basis of the revival of conservative methods of excision. Many surgeons would have appreciated a fuller discussion of Sebrecht's operation and others similar to it. But perhaps Mr. Gabriel wished to avoid debatable aspects of his subject. Certainly the reader can be sure that any operations described in this book have proved their reliability. The illustrations are excellent.

Brief Outline of Modern Treatment of Fractures

Second edition. By H. WALDO SPIERS, A.B., M.D., Professor of Orthopædic and Fracture Surgery, College of Medical Evangelists, Los Angeles. London: Baillière, Tindall and Cox. 1937. Pp. 137. 9*s*.

THE writer sets out to give a brief outline of fracture treatment, calling particular attention to its pitfalls, and emphasising those methods that are modern and important. Rather more than a fourth of the book is devoted to the consideration of general problems, the remainder being concerned with individual fractures, classified on a regional basis. The methods

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advocated are those of modern fracture practice. The task attempted could hardly be accomplished in 137 pages without careful arrangement and the omission of all irrelevant matter. In these respects the book is weak, particularly in the introductory section. The meaning is in many places confused, and several actual errors remain in the text. The illustrations are line drawings, well chosen, and admirably clear.

Synopsis of Digestive Diseases

By J. L. KANTOR, Ph.D., M.D., Associate in Medicine, Columbia University. London: Henry Kimpton. 1937. Pp. 302. 15*s*.

Dr. Kantor has undertaken a difficult task in condensing and summarising a subject which is essentially a wide and rather diffuse one, but he has undoubtedly achieved a remarkably successful result. Digestive disorders may offer such diverse symptoms, and so often fail to conform to any text-book description that any attempt at a synopsis of them might easily give a wrong impression.

Dr. Kantor has avoided too great a precision without losing balance; indeed, it is a pleasant surprise in so slight a book to find so much helpful information. The arrangement of its subject matter is along customary lines—diseases of the mouth, œsophagus, stomach, duodenum, small and large intestine, liver and gall-bladder being dealt with in that order. A useful chapter on intestinal parasites is included; that on diagnostic tests is perhaps too compressed, especially the account of the stool examination.

The advice on treatment also follows orthodox lines and is in general full enough to enable the practitioner to act upon it without consulting larger text-books. The problems of diagnosis are for the most part well set out, and the results of the author's personal experience are clearly presented for the benefit of less experienced readers.

A useful book, surprisingly complete, concise, and free from the faults so often inherent in a "synopsis." It is a delight to be spared unnecessary padding.

Physical Diagnosis

By DON C. SUTTON, M.S., M.D., Associate Professor of Medicine, Northwestern University School of Medicine; Attending Physician and Chairman of the Medical Division, Cook County Hospital. London: Henry Kimpton. 1937. Pp. 495. 21*s*.

Dr. Sutton has set himself the task of giving a concise account of the methods of physical examination—designed (as one judges) both for the student and the practitioner. He has recognised the value of illustrations to this end and his book is amply supplied in this respect, nearly 300 figures, diagrams, and radiograms being included. Both pictures and text are uneven in merit; for instance, while the coloured plates of the circulation in the normal and in various valvular diseases are likely to be helpful to a student learning clinical medicine, the plate showing bismuthia is of little practical importance. Most of the radiograms are exceedingly good. Dr. Sutton has not scorned to devote some pages to the history of clinical diagnosis and has stressed at the start the need for a psychological assessment of the individual and a balanced consideration of the patient as a whole—habits, régime, and the like—as well as environment, in association with the physical signs.

The main chapters are devoted to the examination of the chest, heart, and abdomen, each with a short account of the main diseases found, the normal physical signs, and the variations present in disease.

The rest of the book is concerned with the general methods of examination, the history, body temperature, and the neurological examination.

Physiological Chemistry of the Bile

By HARRY SOBOTKA, Chemist to the Mount Sinai Hospital, New York. London: Baillière, Tindall and Cox. 1937. Pp. 202. 13*s*. 6*d*.

Mr. Sobotka begins this book with a quotation from Peyton Rous's "Biliary Aspects of Liver Disease," which shows how keen is his perception of the need of the physician to distinguish between academic and applied biochemistry. For example, the clinician wants to know how small a biliary disturbance he can perceive. The answer is that the liver is the most silent of organs if only a moderate fraction of its cells are in a healthy state. The ducts from more than three-fourths of it can be abruptly obstructed, without causing even a ripple on the clinical surface. It would be unwise to conclude that minor degrees of disturbance are not worthy of serious study. Far from taking this attitude, Mr. Sobotka supplies a review so complete that it almost defies criticism. The physiology of biliary secretion, its chemical composition, and the modification of biliary secretion by administration of drugs or pathological processes are all discussed in detail. The only disappointing part of the book is that dealing with the van den Bergh reaction, which is dismissed very briefly. A number of quite important English and continental papers on the subject escape mention, but on the whole the present position of the subject is well displayed.

CORRIGENDUM.—The price of Savill's "Clinical Medicine," tenth edition, published by Edward Arnold and Co., is 28*s*. and not as stated in our recent Review of Reviews (Dec. 18th, p. 1435).

REPORTS AND ANALYSES

ENERGEN NUTRIENT BREAD

(ENERGEN FOODS CO., LTD., LONDON, N.W.10)

IT is claimed for this bread that it is more easily masticated than ordinary bread; that the digestion of the starch is quicker and more easily accomplished; and that in calorie values it is considerably more nutritive than white bread. The sample submitted to us for examination was in the form of rolls and batons, the former weighing 5 grammes each and the latter 15 grammes. They are attractive in shape and appearance and very light. On analysis the following results were obtained:—

Moisture	9·0 per cent.
Ash	0·86 „ „
Protein	44·50 „ „
Fat	0·70 „ „
Crude fibre	0·10 „ „
Carbohydrate (altered starch)	44·84 „ „
Calorie value on sample per lb. 1690 (average for white bread 996).	

On the basis of dry matter the percentage of carbohydrate is 49·2 as compared with 82 for white bread.

A bread of this type should be acceptable to the physician in search of a product with a low content of altered starch and a high percentage of protein.

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THE LANCET

LONDON: SATURDAY, JANUARY 8, 1938

NEW BLOOD-SUPPLIES FOR THE HEART

FAMILIARITY with the marvels of surgery makes most of them seem commonplace, but even for the medical man operations on the beating heart still have a dramatic quality. The last few years have seen the beginnings, in this country and in America, of a planned attempt at radical surgical treatment of angina pectoris. We no longer argue whether the classical anginal pain arises in the aorta or in the myocardium. We now regard it as the cry of a distressed heart muscle for more oxygen, for lack of which it cannot beat strongly enough to let its owner walk in comfort or sometimes it cannot beat at all. It has been slowly or suddenly starved of oxygen by the atheromatous or arterio-sclerotic throttling of its own blood-vessels, the coronaries. Why this should happen we have no idea; we often accept it philosophically as part of the process of growing old, and resignedly plan our lives, or our patients' lives, accordingly. If a physician were ever stirred to question that passive philosophy he would no doubt make brave and laborious inquiries into the causes of atheroma, and the influences that may hinder or hasten it, hoping some day to achieve that prevention which is better than cure. Turn to a surgeon, however, and his mind works differently. Tell him the heart lacks blood and he offers to perform an operation for increasing its blood-supply.

On paper it is simple. He knows, since the days of TALMA and MORISON, that he can make adhesions as well as divide them, and since adhesions contain anastomotic blood-vessels he has only to make the heart surface adhere to some neighbouring vascular structure to provide what it needs. In practice, however, that involves a pretty series of problems in technique, and, since the real miracle is the work of the ageing body which has to grow new anastomoses, and enough of them, there is only one way to know whether it works—try and see. The first trials were on dogs, whose coronary arteries were narrowed by silver collars or tied completely; partially freed pectoral muscle or omentum brought up through the diaphragm was then attached to the heart and across the attachment vascular communications developed, which in life would enable a greyhound to run 500 yards in good time and after death could be easily demonstrated by injection methods. The next step was the bold one of doing the same thing in elderly human cardiac invalids. CLAUDE BECK,[1] has operated on twenty-five cases in the United States. He usually uses muscle and fat from the chest-wall for his graft. He introduces some powdered beef-bone round the graft to stimulate a mild inflammatory reaction. He gives quinidine before operation and applies procaine to the surface of the heart, to inhibit extrasystoles and auricular or ventricular fibrillation due to the operative interference. Six of his first twelve patients died, but all of the last nine survived the operation. Three of the survivors dramatically lost their angina and increased their physical activity; most of the rest obtained a material improvement in their symptoms and capacity for exertion. In England the pioneer is Mr. LAURENCE O'SHAUGHNESSY, twenty of whose cases are reported at length in our last issue and in this. His favourite operation is cardio-omentopexy, in which, after a left transpleural exposure of the heart and paralysis of the left diaphragm by crushing the phrenic nerve, a pedicled graft of omentum is brought up through the diaphragm and attached to the heart. Where this seems inadvisable owing to friability of the myocardium he promotes a mild pericarditis, with a view to adhesion, by introducing a preparation called Aleuronat paste. The operation as he describes it is not attended by much shock. Only one patient died on the table, from rupture of a friable right ventricle, and this is an accident that should henceforth be nearly always avoidable. Of the fifteen who had had anginal pain ten were alive six months or longer after the operation; nine of those ten lost their angina, and seven of them were able to resume work which they had previously given up on account of their cardiac disability.

These results, on both sides of the Atlantic, are striking and encouraging, for in such a case the scales are loaded against the surgeon from the beginning: he must restrict his operation, in its early experimental stages, to patients who are hopeless invalids, so that if he benefits even a substantial fraction of them he has done well. Later he may find it justifiable to operate on less severely damaged hearts, and he may be able to alleviate cardiac symptoms other than angina, as O'SHAUGHNESSY has attempted to do in the five cases of his second group. At all times, however, the choice of patient will be a difficult and intricate problem. That precision of diagnosis, assessing both the nature and the extent of damage, which the cardiologists have slowly been building up for years, will be an indispensable guide in the application of this new treatment. Not only must it be shown that the heart to be operated on is ischæmic, but it must be judged whether its disability is due to the death of many of its muscle-fibres and their replacement by fibrous tissue, to weakness of living fibres or the production of pain from restriction of their blood-supply, or to disturbances of rhythm produced by organic ischæmic lesions in the conducting system. In such varying circumstances operation is likely to offer varying prospects. Moreover the degree of disability in each case will vary, and different modifications of technique will have to be tried. The result in a given patient will not always be easy to assess. Bold as the surgeon may be he will not be happy in this involved study without

[1] Feil, H., and Beck, C. S., *J. Amer. med. Ass.* 1937, 109, 1781.

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the coöperation of the cardiological physician. It is good, therefore, to see Mr. O'SHAUGHNESSY's name accompanied by those of Lord DAWSON, Dr. DAVIES, and Dr. MANSELL. This is team-work of the right kind; it has been facilitated by the London County Council; we look forward to seeing it make rapid and solid progress in the fascinating field in which it has made such a promising beginning. We scarcely hope for any great reduction in the death-rate from coronary disease, which the Lambeth workers take as the starting-point of their paper; for the sclerosing process, even in the presence of anastomoses, is likely to advance. Nor do we quite share the attitude of CLAUDE BECK who sees in the absence of normal anastomotic communications between human coronary and extracardiac vessels a "grievious mistake" on the part of Nature susceptible of correction by man. But we see the prospect of added months and years of active life and comfort for a group of people whose bodies usually have been ageing faster than their minds. Such rejuvenation will be a great achievement.

THE RED CROSS: AN END OR A BEGINNING?

IN the evolution of many animals, and especially of man, the struggle for existence has been profoundly modified by the biological after-thought called mutual aid. The struggle is inevitable and eternal, but mutual aid goes far to convert it into a contest between families, tribes, groups, and races, rather than between individuals; it organises men into larger and larger units for their warfare against strangers and for their effort to secure a living from the earth. So much has been made obvious, and it governs everybody's outlook on the present and the future. The lesson that each man draws, however, will depend upon his idea of the unit inside which he thinks mutual aid practicable. The emotional bonds naturally weaken as we pass beyond the circle of our family and friends, but for the average European of the past few generations the essential borderline between friend and foe has been the frontier of his country. To most of us it still seems natural to have sharp national divisions between English and Germans, Chinese and Japanese—divisions meaning that at a given signal the people of each category must act as a unit practising mutual aid (or charity and friendship) only among themselves and recognising no obligation towards the enemy save the obligation to destroy him. Nevertheless the practice of kindness in peace-time, and praise of it from the nursery upwards, makes it difficult all at once to decide that the foreigner has no rights as a fellow man, and in practice the horrors of warfare have hitherto been softened in a small way by conventions, rules, and regulations giving rights to wounded and prisoners and civilians on one side in return for similar rights on the other. Such arrangements—such attempts to "humanise" war—are apparently laudable; but if they involve, as they often do, a disadvantage to one's own side without a certainty of equal or greater advantage later they are an illogical endeavour to serve God at a time when one is temporarily dedicated to Mammon. This was all very well when war was more of a game, when it was waged between kings and governments; but it is increasingly impossible now that it is waged between whole nations and is correspondingly more serious. The aeroplane and the blockade have extended the boundaries of warfare so that every civilian becomes a combatant.[1] Those who make war to-day intend to win at almost any cost, and it is not surprising to find them more and more inclined, for example, to torture and kill their prisoners when it suits them and to bomb hospitals by way of routine.

The red cross is a symbol of neutrality—comparable to a flag of truce under which the wounded are rescued and cared for. The wearer of this badge has certain privileges and in return for them agrees to bear no arms and to render similar service to the enemy if they take him prisoner. The idealist may therefore look upon the red cross worker as the representative of peace in the midst of war, of sanity in the midst of madness—a man serving something higher than either combatant can serve. And we do not deny that this is sometimes so. The military authorities however, more realistically, regard their medical corps merely as auxiliary services necessary to success in any large or prolonged operations in the field. The value of a doctor to them is such that during the late war they recalled medical students who had been expensively trained as combatant officers and sent them back to medical schools to qualify as non-combatant medical officers. To-day we see the Committee of Imperial Defence taking steps to secure the aid it would urgently need from medicine if war were to break out; and this is only its duty. The plain fact is that the doctor serving a modern army in any capacity is no more neutral than the munition-worker or the artillery-man. And since he is not neutral he will be bombed. And when he is bombed he will be compelled to remove or camouflage the red cross that no longer protects him—as had to be done by hospitals in Abyssinia and is being done by hospitals in Spain. The logic of events and of "totalitarian" war lessens the distinction between medical and other branches of the fighting services and brings the medical profession and such organisations as red cross societies and ambulance associations into the direct service of the military authorities, which in war control the State. Hence the red cross loses its significance and may as well disappear. It remains no doubt a convenient sign for a dressing station, displayed for friends rather than the enemy; but it is no longer a symbol of neutrality and no longer a symbol of a service that recognises no difference between men of differing beliefs and races.

A proportion of doctors in this country have been shocked at the thought of being enrolled for war service, and in a letter that we published on

[1] This tendency is discussed by Mr. T. B. Layton in a review published in the *Guy's Hospital Gazette* for Nov. 6th, 1937, p. 474.

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Dec. 18th the committee of the Medical Peace Campaign speak of the "independence of conscience and judgment to which the profession is entitled and which it is its duty to claim." We cannot see that the members of our profession are entitled to any more independence of conscience and judgment than the butcher, the baker, or the candlestick-maker; but there are certainly reasons why their opinions might in fact differ from those of men and women engaged in other work. In the first place they may feel that their everyday endeavour to relieve misery and save life—none too successful at best—is betrayed and almost made ridiculous if they must be ready at any moment to take part, even as auxiliaries, in wholesale damage to human bodies and human happiness. Secondly, they are in a peculiarly favourable position to understand the emotional disorders causing war and to realise its needlessness and biological futility. Thirdly, and most important, they have all more or less consciously accepted the advanced creed defined in the declaration used as a motto by one of our hospitals: *Homo sum; humani nihil a me alienum puto*—a statement that the doctor will serve all mankind, finding nothing and no one unclean. To-day the large majority of Europeans are patriots and content to be so. A large minority have found new and over-riding loyalties in the extranational struggle between capital and labour and are willing to go to any lengths for the benefit of Left or Right. A third group, however, believes that a loyalty more comprehensive than either of these is needed; that the principle of mutual aid must be applied to mankind rather than to sections; that war between men no longer serves a biological purpose; and that the true struggle for existence, which alone justifies the sacrifice of life, is the struggle of man as a whole against nature. It is easy to belong to this group in theory, but excessively difficult in practice; for the belief is useless unless it means that the believer takes no further part in the internecine struggles of class or country. Nor must he stop there, for the service he would have given to country or class should belong to the race, and he must try to redress wrongs or mitigate suffering wherever he finds them, abroad as well as at home. None will deny that much work of this kind is already being done by the medical and allied professions in all countries, and it is imaginable that a definite movement towards construction rather than destruction could be founded within these professions, its members binding themselves not to give any active help in the prosecution of war but otherwise to work for the relief of suffering at all times. An organisation with this aim would have to prove its worth in peace even more than in war and would have to adopt some of the methods, as well as the traditions, of other bodies of men who have achieved miracles by coöperation and self-denial. But in its attempt to rise above prejudice it would essentially represent a revival of the idea underlying the red cross, and it might gain many adherents among those who believe that, despite all the complexities of ethics and the arguments of militarists or economists, it is wise in the long run to succour the afflicted. In so far as mutual aid is in truth the main civilising force among men this new red cross would be a banner of civilisation, as the old has often been; and those who fought for it would be able to bring a positive ideal before a world that is unquestionably asking for positive ideals. In this campaign, however, they would need more than heroism; they would need a change of heart. For in the circumstances of to-day it is all too evident that nearly all of us are English or German or Japanese or communists or property-owners before we are doctors and scientists.

THE LONDON M.B. FINAL

IT has long been a matter of concern in university circles that nearly half the medical students who pass the 2nd M.B. Lond. fail to obtain a degree. They qualify as doctors by taking a registrable diploma and many never even sit for the final M.B. examination. Most if not all of them genuinely intend to continue work for a degree; but the temptation to rest at the attainment of a qualification that is everywhere respected may prove irresistible. Even those more resolute or ambitious men who eventually graduate usually sit for the Conjoint first, and for a variety of reasons: they are eligible for it earlier; it is reputed to be easier; it can be taken in a leisurely stride, that is in four parts (with intervals between them) rather than as a whole, or at best in two parts with a consequent delay of six months. Success confers a professional status only slightly less dignified than that of graduation; and to the public at least eight capital letters are as impressive as four. The extra fee—some 40 guineas—is balanced by the ability to start earning, if only board and lodging, a few months earlier. A reason not perhaps given full weight in discussions on this tendency to default from the academic ideal is the force of custom. It has become customary in London to take the diploma on the way to a degree almost as a matter of course, and students are convinced that there is some advantage in doing so; in fact in some hospitals a man who does not qualify with his fellows but waits to take a degree is held to run a risk of being passed over for a house appointment when competing with the next batch. At any rate there seems to be no deliberate policy of discouraging a procedure that certainly contributes to the prosperity of the Royal Colleges, to which most clinical teachers at the hospitals feel at least as much loyalty as to the University.

The hospital medical schools in London are recognised schools of the University. If they were not, and if they were heavily endowed or self-supporting from fees, or were even partially subsidised by the Royal Colleges, they would be under no obligation to swell the M.B., B.S. pass list. But nowadays a medical student's fees go only a little way towards meeting the cost of his education, and the grant allocated by the State to his school through the University Grants Committee is by definition given to promote

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training of university standard. It was after representations from this committee a year or two ago that the deans of some of the schools made it clear that in the selection of students those entering for a degree would have preference. In practice however such a policy affects the potential rather than the actual number of graduates emerging from the school. Several ways of meeting the situation have been suggested, but none that would not entail some loss of prestige or of money for one of the three bodies concerned—the University, the Royal Colleges, or the medical schools. Complicating factors include the external side of the University, ever vigilant to safeguard its privileges, and the objection to any arrangement between the University and the Colleges that is not applicable to Oxford, Cambridge, and other universities whose students do clinical work in London. It is an open secret that attempts have been made in conversations between representatives of the University and of the Royal Colleges to seek a basis for some amalgamation of the two examinations. The mechanism of such a compromise—whether enabling the diplomate to graduate by taking certain supplementary papers, or raising the standard of the Conjoint Board's examination in certain respects to meet university views—is not at the moment the thing that matters.

It is the principle whether it is for the University to take any steps at all—beyond perhaps modifying the severity of the test—that has been debated with some heat. The University has been enjoined on the one hand to be jealous of its academic status, on the other to show common sense in trying to reach adjustment that will bring to an end profitless rivalry. The fact that some of the protagonists are in the inner counsels of both university and colleges has led to a certain conflict of loyalties. The recent election of Mr. P. H. MITCHINER to the senate of the University will strengthen the party opposed to the delegation by the University of its exclusive right to test the competence of its students. It is a secret as open as that of the "conversations" that the appropriate boards of the University have recently been considering the revision both of the curriculum and of the examinations, in the light of the report of a joint conference which included representatives of the universities of London, Oxford, and Cambridge, of the Royal Colleges, and of the Society of Apothecaries. The wisest action would seem to be to expedite the introduction of any changes designed to make a medical degree, as much in London as elsewhere, the normal sequence of an ordinary conscientious undergraduate's course of study.

ANNOTATIONS

"PHENYLPYRUVIC OLIGOPHRENIA"

THE standardisation of nomenclature in medicine is an ideal at present very far from being realised. Nevertheless it must be exceptional for a rare syndrome to acquire five or more titles within three or four years of its recognition. Imbecillitas phenylpyruvica, phenylpyruvic amentia, phenylketonuria, and Fölling's syndrome are terms that have been interchangeable until recently and now Jervis,[1] in an introductory study of 50 cases, proposes the name phenylpyruvic oligophrenia. The condition thus variously described is one that has great intrinsic interest alike for psychiatrists, biochemists, and students of heredity. Familial association between imbecility and the urinary excretion of phenylpyruvic acid was first noticed by Fölling[2] in Norway, and shortly afterwards cases were identified in England,[3] France,[4] and the United States. Like alkaptonuria the disease is inherited recessively, and Jervis has been able to show, by the use of methods devised by Weinberg and Hogben, that the ratio of affected to normal children in families where the disease occurs is in very close agreement with mendelian expectation. The parents of patients have always hitherto been described as normal, but in one of Jervis's cases an affected female imbecile had four children of whom two were likewise affected. If the disease is recessive the father of these children must have been a carrier—a probable circumstance only if he were a blood relative of the mother—but unfortunately no facts about the father are given. In three of the cases, however, both parents were normal and consanguineous.

Among Jervis's cases there were twenty males and thirty females. All were mentally defective and the majority had intelligence quotients below 25. On neurological examination several showed rigidity, active deep reflexes, and other signs that are interpreted by Jervis as evidence of an extrapyramidal syndrome. The Wassermann reaction was negative in every case. Some patients were subjected to feeding experiments and the results of these were similar to those obtained by Penrose and Quastel,[5] tending to confirm the view that the fundamental abnormality is inability to break down phenylpyruvic acid. Jervis's work, which we hope will soon be published in full, is a valuable addition to knowledge of this remarkable abnormality.

LONDON WELL WATER

IN addition to the river water from Thames, Lee, and New River, the people of London, as Colonel Harold reminds us,[6] derive their supply from 55 chalk wells, some of which extend down into the greensand. In the early days of the Metropolitan Water Board's activities water from the chalk enjoyed a deservedly high reputation for purity. Chalk, being a relatively compact but porous material, is a good filtering medium, and its basic character favours the oxidation of nitrogenous organic matter to nitrate, provided sufficient oxygen is dissolved in the percolating water. The removal of bacteria should be considerable, so long as the compact nature of the medium is maintained. On the other hand, percolating water which has become highly charged

[1] Jervis, G. A., *Arch. Neurol. Psychiat., Chicago*, November, 1937, p 944.
[2] Fölling, A., *Hoppe-Seyl. Z.* 1934, **227**, 169.
[3] Penrose, L. S., *Lancet*, 1935, **1**, 23 and **2**, 192.
[4] Rhein, M., *C.R. Soc. Biol. Strasbourg*, 1936, **122**, 807.
[5] Penrose, L. S., and Quastel, J. H., *Biochem. J.* 1937, **31**, 266.
[6] Metropolitan Water Board: 31st annual report on water examination. By Lieut.-Col. C. H. H. Harold, M.D., D.P.H. London: P. S. King and Son. Pp. 117. 10*s.* 6*d.*

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with carbon dioxide from the soil air dissolves some of the chalk in its passage to form calcium bicarbonate, the water thereby acquiring its characteristic hardness and the chalk itself becoming less compact. Under natural conditions or when a well has been sunk and the demand for water is not excessive this effect may be insignificant, but with increased pumping and deepening of the well to tap a larger area the conoid of supply becomes greater and much of the water reaches the well by relatively rapid routes through swallow holes and fissures, new channels being formed as a result of solution and erosion. Colonel Harold puts it this way. With the widely diffused systems which abound in the chalk it is obvious, he says, that healthy conduits or fissures may have access to or communication with those bearing impure water and, by the erosion resulting from pumping, intercommunication may be enormously facilitated. For such reasons the passage of swallow-hole water may be traced to wells some miles distant within 72 hours. It is therefore essential, he remarks, particularly with chalk wells going straight into supply, that changes or alteration in bacteriological quality should be detected at the first possible moment. During the thirty-one years of water examination under Colonel Harold and his predecessor, the late Sir Alexander Houston, continuous records have accumulated of the bacterial and chemical characters of London waters under every meteorological condition. These findings have led to the crystallisation of ideas regarding the controversial coli-aerogenes pollution. The first evidence of deterioration of the quality of water in a well, even before an increased colony count, may be the appearance of atypical coliform organisms, which may increase to a concentration of one or more per mil before the typical colony appears. In other words the danger sign, or red light, of pollution is the atypical coliform organism. As the degradation of the well progresses, typical dominance is established and this becomes more apparent with the use of preferential methods of isolation. When the general level of water is high and especially where, as in the northern district under the Board's control, the chalk is covered by clay the movement of water underground is less rapid and less direct than in times of drought, and the water pumped from a deep well is mainly that which has been underground for a long time with better opportunities of filtration and of removal by death of organisms of all kinds. The worst combination of circumstances is for drought, which has served to emphasise the existence of channels, to be succeeded by periods of heavy rainfall, as occurred in 1935–36. If the drought and the break thereof did nothing else, Colonel Harold concludes, it permitted of a critical and controlled study of the advance of pollutions from the minor to the more serious stages, when in every instance the application of chloramine treatment closed the chapter.

AGRANULOCYTOSIS AND ITS TREATMENT

Dr. Preben Plum publishes his own experimental and clinical observations on 88 cases of agranulocytosis in the form of a monograph [1] which includes a review of the literature of the subject, with over 400 references. The result is a concise and valuable summary of present knowledge, well illustrated by diagrams, tables, and pictures of the marrow obtained at autopsy and by sternal puncture. He concludes that, in Denmark at least, amidopyrine is by far the commonest cause of the disease, and advises that the use of this drug for any purpose should be forbidden. The curves for the consumption of amidopyrine and for the incidence of agranulocytosis in Denmark run parallel, and continuing work described in our columns three years ago [2] Plum was able to demonstrate that in persons sensitive to amidopyrine small doses of the drug produce a decrease in the immature granulocytes of the bone-marrow preceding a fall in the number of circulating granular cells. He found that other drugs had no such effect in these people, while amidopyrine was without influence on the marrow of non-sensitive persons. His case reports show further that clinical symptoms are preceded by these changes in marrow and peripheral blood. From his own experience he attributes little value to any therapeutic measure, and in this connexion a recent report from France is of considerable interest. Dr. Ravina [3] discusses 3 cases of agranulocytosis treated in different German clinics with transfusions of blood from patients with myeloid leukæmia: in one of them fourteen transfusions were given, in another recovery followed two transfusions of 500 c.cm. It is suggested that the high white cell content of the leukæmic blood sufficed to tide the patients over the period during which their own marrow was out of action, and also acted as a stimulant to leucopoiesis. Admittedly in one case radiotherapy and pentose nucleotide were also given so that the value of the leukæmic transfusion is by no means certain. On the other hand the prognosis in this condition is so bad that if the leukæmic blood is available its effect ought to be tried more carefully.

WORKMEN'S COMPENSATION FOR SILICOSIS

THE diversity of methods adopted in applying the principle of compensation for silicosis in different countries is shown by the report summarised on another page. The methods in use fall into two main groups: (1) silicosis classed with other industrial diseases and, like them, assimilated to the compensation law relating to accidents; and (2) special legislation introduced to deal expressly with silicosis. The question arises which method has greater advantages. The first, adopted in Germany and more recently in a number of other countries, involves the inscription of the disease on the schedule of industrial diseases covered by the Workmen's Compensation Act, and followed by the usual procedure of examination of a claimant by the appointed practitioner and payment of compensation by the last employer. It seems on the face of it a convenient method; but silicosis presents some peculiar characteristics. First, it is insidious in onset and slow in development, making difficult the apportioning of liability among different employers. Secondly, its diagnosis is difficult in the early stages; the International Labour Conference (1934) resolved that only medical men specially qualified and suitably equipped, especially with radiological facilities, should be entrusted with the diagnosis and certification of silicosis. Thirdly, the gradual development of the disease might lead some employers to discharge workmen with suspicious symptoms, in order to evade a possible liability.

For such reasons the British Committee on Compensation for Industrial Diseases (1906) favoured special trade insurance schemes for silicosis, rather than its inclusion in a schedule with other industrial

[1] Plum, P., Clinical and Experimental Investigations in Agranulocytosis. Copenhagen: Arnold Busck; London: H. K. Lewis and Co. 1937. Pp. 410. 18s.

[2] Plum, P., *Lancet*, 1935, **1**, 14.

[3] Ravina, A., *Pr. méd.* Dec. 8th, 1937, p. 1760.

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diseases. The South African Government, faced with the problem in an acute form, followed the recommendations of the committee in setting up their special legislation. The South African system was devised to deal with one industry (gold-mining) in a well-defined area—the Witwatersrand. By means of central compensation funds to which all scheduled mines contributed, compensation was assured to workmen migrating from one to another, and to those who had contracted the disease in a mine subsequently closed. Diagnosis by private medical practitioners having been tried and found unsuitable, the responsibility was placed in the hands of a medical bureau of whole-time experts, who made initial and periodical medical examinations. In Great Britain many industries were involved, and processes scattered throughout other industries and subsidiary to their main purpose had to be covered; to meet this position legislation within the Workmen's Compensation Acts was introduced in the form of an enabling Act which gave power to make suitable schemes. The first and one of the later schemes provided for a central fund maintained by contributions from all employers in the industry. Medical examinations were first made by the tuberculosis officers of local authorities, and later by a whole-time medical board, who also issued all certificates for compensation. This last provision was later extended to the other schemes.

The fully developed system of South Africa probably provides the most precision in diagnosis and equity in administration. The two fully developed schemes in the British system are of the same order. Under the system of blanket coverage in force in parts of the United States insurance carriers are required by law to cover by compensation insurance any employer who is entitled to insurance coverage, and to assume their proportion of unwanted risks. Advocates of this system regard any other as unjust, illogical, and ineffective; those against it point out that with laws having no schedules payment of compensation is often delayed, and legal and other entanglements may arise. An important defect in both blanket coverage and the inclusion of silicosis in a general schedule seems to be the absence of special medical tribunals with definite standards of diagnosis. Any system of compensation for silicosis should be considered in its relation to preventive measures. Those which have the effect of stimulating active measures and research will be the most successful in the long run.

SUCTION LAVAGE OF THE NOSE

ONE of the difficulties encountered in nursing patients with scarlet fever, measles, or diphtheria complicated by rhinitis or sinusitis is the difficulty of clearing away the profuse discharge. This also arises sometimes in other forms of rhinitis and sinusitis, while in ozæna the removal of crusts is apt to be troublesome. They are usually got rid of by nasal irrigation with syringe or douche-can, or simply by snuffing the lotion from the palm of the hand; but irrigation may cause harm by the entry of fluid into the sinuses or middle ears, and to avoid this risk Dr. King,[1] of Peiping, has devised a method whereby the lotion is sucked through the nasal passages under negative pressure. A nozzle is inserted into one nostril and connected through rubber tubing with a douche-can, the fluid in which is kept below the level of the nose, while a second nozzle in the other nostril is attached through a wash-bottle to an electric or water suction pump. The patient continues to breathe through the open mouth, and the negative pressure tends to draw up the soft palate and shut off the nasal passages; this is necessary for the suction effect and, if the flow does not start, it can be helped by the patient pronouncing the letter K to raise the palate. A small hole may be cut in the tubing near the inlet nozzle to admit air and, controlled by a finger, to make the flow intermittent; an interrupted flow has been found preferable to a steady stream. A similar hole in the outlet tube, kept covered by a finger, can be used to release the suction should it become uncomfortably strong. The method has proved highly satisfactory in the Peiping Union Medical College Hospital. It is fairly simple and deserves a trial elsewhere.

[1] King, T., *Chin. med. J.* November, 1937, p. 739.

HARVEY'S HOUSE AT COOMBE

IN his will written with his own hand about the year 1652 William Harvey refers to "all that Linnen householdstuffe and furniture which I have at Coombe near Croydon." It was at Coombe also that towards the end of 1650 Dr. George Ent, president of the College of Physicians, made his historic visit to Harvey and obtained the manuscript of "De Generatione." A further point of interest regarding this residence is that, according to John Aubrey, the house had "a good aire and prospect" and Harvey had caves made there in the earth in which he meditated in the summer. "He did delight to be in the dark, and told me he could then best contemplate." It is perhaps hardly surprising that in spite of the numerous attempts that have been made to obtain further information concerning William Harvey, nobody has yet succeeded in identifying the position of his house at Coombe. The researches of Mr. Clarence Paget however, the secretary of the Record Society, who lives at Croydon and has recovered much of its past history, have now brought to light new evidence that places the site of the Harveys residence at Coombe beyond reasonable doubt. From his latest publication[1] it would seem that the house now known as Coombe Lodge was formerly the mansion of the whole estate, and Mr. Paget shows that in September, 1624, this Coombe property was purchased by George Mellish, "citizen and merchant taylor" of London, who was brother-in-law of Daniel, the brother of William Harvey.

In a deed dated Oct. 1st, 1641, Daniel Harvey purchased for £1200 all the freehold estate of his brother-in-law at Coombe. In this surrender the house is described as being then in the tenure of Daniel Harvey, Esquire, of London, or his assigns, and long before this date there is evidence in the Parish Register of Croydon of a close connexion of the Harvey family with the parish. Thus under the date of July 1st, 1625, there is an entry of the burial of a Daniel Harvey, presumably a child of the doctor's brother. Hannah, daughter of Daniel Harvey, was baptised on August 28th, 1634, and buried two days later. Another daughter Sarah, afterwards the wife of the second Viscount Bulkeley, was baptised in 1636, and a son William was baptised on August 18th, 1637, and buried two days later. Thomas, son of Eliab Harvey, was baptised in September, 1636, and buried seven months later. All these entries suggest that Daniel Harvey was tenant of his brother-in-law's house at Coombe for some years before he actually became its owner.

At the manor court of October, 1641, at which Daniel Harvey was admitted to the Coombe property,

[1] Croydon Homes of the Past. By Clarence G. Paget. Croydon: the Central Library. 1937. 2s.

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he also obtained permission to enclose 120 feet of the common called Coombe Heath adjoining his house and thereupon to erect stables and outbuildings, paying yearly to the lord of the manor for the same fourpence. Reference to this additional 120 feet of land lying near to the manor house upon part of which there was a stable erected was made when Coombe Lodge was sold in 1831, and this clearly identifies Daniel Harvey's house with Coombe Lodge. In October, 1640, another of the Harvey brothers, Mathew, purchased for £500 a messuage in Coombe with 12 acres adjoining it. In Mr. Paget's opinion this house and its grounds in all probability adjoined the Coombe Lodge estate on its eastern side, and a good residence can be traced to have existed on that site until about the end of the eighteenth century, when it was either pulled down or incorporated with Coombe Lodge. After two years, in 1642, Mathew Harvey died and was buried at Croydon; the entry in the Parish Register in the vicar's handwriting being as follows: "1642, December 30th, Mr. Mathew Harvey, a worthy gentleman, merchant of London was buried." In his will dated August, 1642, Mathew Harvey left all his property in Surrey to Daniel the younger, the son of his brother Daniel, who thus became possessed of his uncle's estate at Coombe as well as that of his father which he inherited a few years later.

Daniel Harvey sen. fell into trouble with the Parliament, who assessed him in a fine of £5000. He refused to pay, and in 1644 his rents, goods, and estate were ordered to be seized and sold, and he was imprisoned. Eventually, after paying £3000, Daniel was ordered to pay another £1000 for his discharge. He did not long survive this ordeal, and the death of Daniel Harvey was presented at a court of the manor of Croydon on Oct. 24th, 1647; his son Daniel, then a minor of sixteen in the custody of his mother, succeeded to his Coombe estate. In his will Daniel Harvey left his brother William £1000. Daniel Harvey jun. had a distinguished career. He was educated in Croydon by Mr. John Webb, the master of Whitgift's Free School, between 1639 and 1643. He was knighted at the Restoration in 1660, and was later ambassador at Constantinople. In 1662 he sold his estate at Coombe to John Pinsent of Lincoln's Inn, and went to live at Coombe Nevill, near Kingston-on-Thames.

Mr. Paget is to be congratulated on having brought to light this new information concerning the Coombe estate of the Harveys. Coombe Lodge, a beautiful old red brick house, is now in the possession of Sir Herbert Brown. We may well hope that some day will be found the caves in which William Harvey contemplated to such purpose.

PAINLESS CARDIAC INFARCTION

THE most familiar clinical picture of cardiac infarction is the one in which pain and shock are combined at the onset, and later as these clear up the not infrequent appearance of congestive heart failure. But instances are not rare in which any one of this triad may alone be present at the onset. For example, in a patient already showing some symptoms of congestion, the only expression of an infarct is a sudden increase in these symptoms—it has long been known that anginal pain and congestive heart failure are to a great extent antagonistic. Another variant is sudden collapse, the picture being that of severe shock. Apart from those cases where there is infarction in an already failing heart, the absence of pain may perhaps be accounted for by the variations in the sensitivity of the central nervous system. Boyd and Werblow,[1] however, mention the possibility of a local lesion in the cardiac nerves being responsible. They consider that a previous infarction may have interfered with the function of the nerves so that a second infarction near-by might involve an insensitive area. Pain was absent in a third of a series of 127 patients. In 7 illustrative cases, the details of which are described, the symptoms were those of failure or shock, or both. Dozzi[2] mentions another guise that these cases may assume. Cerebral embolism is of course a recognised complication of cardiac infarct and cerebral thrombosis may also occur as a consequence of the lowered blood pressure. He points out that when this follows an atypical onset, the case is apt to be diagnosed as one of cerebral vascular accident only, the primary cardiac lesion being overlooked. The patient's mental condition does not allow him to give much help in the history, which adds to the difficulty. In 1000 consecutive autopsy reports Dozzi found 12 instances of cerebral thrombosis or embolism among 41 of cardiac infarct; but the cardiac lesion was suspected in two only. This unusually frequent association of the two lesions suggests that in all cases of cerebral vascular accident, the possibility of a primary cardiac lesion should be borne in mind.

FRACTIONATION OF ANTIHORMONE SERA

THE production of serological antibodies against the protein-like hormones was discussed in these columns a few months ago.[3] A further contribution to the study of this phenomenon has been made by Prof. Harington and Dr. Rowlands, with the coöperation of Dr. Hartley,[4] and they are able to describe chemical fractionation of antithyrotropic and antigonadotropic sera. Antithyrotropic serum was prepared by injecting a crude extract of ox pituitary into rabbits, and the potency of the rabbit serum or fractions thereof was tested by its power to inhibit the effect of a standard preparation of thyrotropic hormone in immature guinea-pigs. Antigonadotropic sera were prepared with three different materials—viz., by injecting crude ox-pituitary extract into rabbits, by injecting an extract of pregnancy urine into a goat, and by injecting pregnant mare serum extract into rabbits. The antigonadotropic activities were assayed in the first case by the effect on ovulation in rabbits after mating, and in the other two cases by the inhibition of gonadotropic activity in immature rats of preparations similar to those employed to produce the antisera. So far fractionations have been carried out by orthodox but relatively crude methods, but the results show quite clearly that the "anti" effect is associated with substances that go almost quantitatively into the globulin fraction. Antithyrotropic activity is associated with the pseudoglobulin fraction, whilst antigonadotropic activity is divided between the pseudoglobulin and the euglobulin fractions. The dried fractions were stable on storage, but the activity was destroyed by heating. The theoretical importance of these observations lies in the demonstration that the so-called antihormones behave like other well-known antibodies, in a way completely consistent with the assumption that they are protein-like antibodies whose formation is provoked by protein-like antigens.

[1] Boyd, L. J., and Werblow, S. C., *Amer. J. med. Sci.* December, 1937, p. 814.
[2] Dozzi, D. L., *Ibid*, p. 824.
[3] *Lancet*, 1937, 1, 1471.
[4] C. R. Harington, F.R.S., and I. W. Rowlands, Ph.D., *Biochem. J.* 1937, 31, 2049.

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The bringing of antihormonal effects into line with antigenic phenomena renders still less probable the hypothesis once discussed that internal regulation of the active hormonal level in the body proceeds by the same mechanism as that acting when animals lose sensitivity to injected extracts.

Practically the value of this new work lies in the preparation of stable concentrates. This is a step in the direction of producing material suitable for clinical application, which as yet is only entering the experimental stage.

TOMOGRAPHY OF THE LARYNX

TOMOGRAPHY is a method of radiography that gives good definition of the structures at a particular chosen level, and leaves the rest, so to speak, out of focus. It has already proved helpful in the examination of the lungs, and Canuyt and Gunsett [1] of Strasbourg recommend it for the study of disease in the larynx. Ordinarily radiograms of this region are taken in the lateral position, giving a profile view in which the image of one side of the larynx is superimposed on that of the other side, and this makes it difficult or impossible to judge exactly the form and extent of a tumour. Likewise an anteroposterior radiogram is obscured by the shadow of the vertebral column. This difficulty is avoided by tomography, which provides an arteroposterior picture—in effect a radiographic section—at any required level; for example, through the centre of the glottis or in the arytenoid region. Several radiograms illustrate Canuyt and Gunsett's paper, and though it is not fair to judge them by their reproductions three pictures of the normal larynx show clearer detail than could be obtained by other methods. Radiography takes a relatively small place in the diagnosis of disease of the larynx, but it can render good service on occasion, especially in determining the degree of subglottic extension of a malignant growth. For such a purpose tomography seems to be a notable advance in technique.

NEW DEVELOPMENTS AT THE CHRISTIE HOSPITAL, MANCHESTER

TWO major schemes which are now near completion at the Christie Hospital and Holt Radium Institute will greatly improve the facilities for the treatment of cancer in Manchester. One is the provision of a special pavilion for private patients built in response to a demand, endorsed by the National Radium Commission, that the full advantages of modern radiation therapy should be made available to all classes of the community. The provision of accommodation for private patients in a large treatment centre with a team of trained workers is the only method of meeting this demand; and the fact that the Christie Hospital also supplies a highly specialised surgical service enables combined treatment to be undertaken. Part at least of the accommodation in the main building that will be set free when the new rooms are ready is to be used to extend a scheme already initiated—the provision of dormitory beds for patients from a distance who require X ray treatment extending over several weeks, but are not confined to bed and require no special nursing. This way of housing patients is popular with them and is less expensive for the hospital than admitting them to ordinary wards. The new X ray therapy department is now available for the treatment of patients although the whole of the apparatus is not yet installed. The four continuously evacuated Metropolitan Vickers tubes are designed to provide the maximum of flexibility with the minimum of controls. The tubes will normally be run at 250 kilovolts, two from each generator, but three or four can be run from one generator so that any tube or either generator can be isolated for cleaning or repair with the least possible disturbance of the treatment schedule. Stabilisation of the kilovoltage and current will be automatic, not, as is usual, under the control of the technician; since there will be an ionisation chamber for each tube the output can be observed easily. The object of this arrangement is to enable the technician to concentrate on the details of treatment rather than on the mechanism of his apparatus, and to allow the physicist to adjust the output for varying field sizes and distances. A continuously evacuated tube operating at 500 kv. is also being constructed for the department by Messrs. Metropolitan Vickers, who hope to be able to design a unit which will operate at this high voltage without much loss of flexibility. Experience in America suggests that for deep-seated lesions the use of high voltage radiation is advantageous, not only because the focal skin distance can be increased to obtain a better depth dose but because the shorter effective wave-length obtained produces less reaction in the skin. The results obtained with this apparatus will be watched with attention by those working at other centres.

[1] Canuyt, G., and Gunsett, *Pr. méd.* 1937, 45, 1559.

THE NEW YEAR HONOURS

AN honours list is apt to inspire the same feelings as a prize-giving—though the King has not yet gone so far as to preface one with the familiar consolation that "those who receive the honours are not always those who do best in life." Nevertheless it is very pleasant to see recognition—even if it sometimes seems inadequate—of services that are very real, and the list we publish on p. 114 contains many reasons for such pleasure. It is Lord Horder's assistance to the Royal Family that brings his G.C.V.O., but he might just as fittingly receive this high distinction for his public work. General Walker, who becomes K.C.I.E., deserves well of his country and of India, and Dr. F. Barrie Lambert, now D.B.E., has earned her title in several fields, most recently on the L.C.C. Of the new knights bachelor, Prof. R. J. Johnstone has long been well known and well loved as an obstetrician and a representative of medicine, and he is this year's president of the British Medical Association. Dr. C. M. Wilson had a vision of what his medical school, St. Mary's, might become, and has realised that vision by devoted effort. Mr. J. W. Leech, after practising and teaching surgery at the Newcastle Medical School, became Lord Mayor of the city, and has for many years been one of its Members of Parliament. Dr. W. G. Savage, while responsible for the public health of Somerset, has made himself the greatest authority, in this country at least, on the production of safe milk and the elucidation of food-poisoning. Outside the ranks of medicine itself we may note the viscounty bestowed on Lord Nuffield, and the knighthoods for Mr. E. W. Meyerstein, another benefactor of hospitals, and for Mr. D. R. Wilson, chief inspector of factories. Mr. T. F. Sibley gave fine service to the universities of Wales and London before accepting his present post of vice-chancellor at Reading. The list of new officers of the Order of the British Empire includes the names of Miss Louie Brooks, long secretary of the London (R.F.H.) School of Medicine for Women, for services to the Lady Dufferin Fund Association, and Mr. R. H. P. Orde, secretary of the British Hospitals Association.

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SPECIAL ARTICLES

CHILD HEALTH IN THE GOLD COAST *

By CICELY D. WILLIAMS, D.M. Oxon., M.R.C.P.Lond., D.T.M. & H.
COLONIAL MEDICAL SERVICE

THE mortality and morbidity of the children in West Africa, as in most primitive communities, is high. At first sight, few adults appear to be diseased or malnourished, while many of the infants are very pleasing. And yet in every village, and in many towns, the children, especially those of the toddler stage, are so unhealthy as to be conspicuously unshapely. Probably less than 50 per cent. of the babies born alive survive to maturity.

GENERAL ENVIRONMENT

In order to assess the factors that are adverse to health, especially to child health, it is necessary to survey the environment and the habits of the community.

The Gold Coast has an area of some 90,000 square miles. The climate as a rule is damp and warm. The population is over 3,000,000, including about 300,000 immigrants from Liberia and British and French West Africa. The land is not unfertile. There is little poverty. The country produces nearly half the world's total cocoa, while gold, diamonds, and manganese are mined with increasing profit. There is no European ownership of land, so that the wealth of the country is shared by the African population.

The various tribes differ to a certain extent in their habits, food, and mode of living, but the differences are often of ethnological rather than of sociological interest. The main difference is between the Moslem tribes from the north and the pagan or semi-Christian people of Ashanti and the Colony. Each village has its chief, supported by the "stool-elders." The system is partly hereditary, succession being through the females, and partly democratic, the chief being elected from a number of eligibles. Land rents and court fees are supposed to be used for public purposes, sometimes schools and roads, and sometimes for celebrations when gin and gunpowder take the place of *panem et circenses*. Each village owes allegiance to a paramount chief. The larger towns are divided into companies and the system is nominally well organised. Actually there are many squabbles, partly because education is tending to "detribalise" a proportion of the community and partly because native institutions "developing along natural lines" are being invested with increasing and unaccustomed responsibility.

The African male is much addicted to the habit of sitting in the shade and playing *warri*, discussing his prowess, or manufacturing political and litigious situations. He is content to see his womenfolk heavily overworked on his farm or to pay wages to an alien labourer. His interest in the sterile minutiæ of tribal politics is reflected in the large proportion who study law if they go abroad for their education. This preoccupation is now being fortified and supplanted by the intricacies of British litigation.

Many of the people are nomadic by tradition. The men are no longer hunters or warriors. Their interests are not yet sufficiently re-orientated to economic and practical occupations. The fishermen of the coast form some of the most static members of the population. The others wander from farm to village and village to town according to the season, the festivals, and the family requirements.

In spite of the numbers of missionaries and schools, Christianity as yet has made little headway; except for a very few, church-going on a Sunday does not preclude other observances during the week. The Moslems form a small minority, most of the people belonging to the fetishes. The ills to which human flesh is heir are put down to evil spirits, witches, and the instigation of enemies. Personal religion is assisted by all manner of charms and symbols. Ceremonial performances are frequent, noisy, and excitatory; human sacrifice is not unknown. Priests and witches wield great power. Some native "doctors" combine witchcraft with medicines, while others are pure herbalists, and some of their cures are genuine and convincing; they undoubtedly have some effective treatment for tetanus. Their methods are complicated but would repay investigation.

Education is highly prized by the Africans, often in the hope that it may lead to a sedentary occupation. They are attentive and eager pupils. They are ready to absorb masses of information while they rarely attempt to digest it. They rejoice the educationists, while those who have to deal with the finished products of their efforts are not so complacent.

Recreations consist mostly of dancing, singing, drumming, games, and story-telling, and they form an important part of village life. The children take part in it all. Even the babies may be half-choked with dollops of palm wine during a festival. You will see the mothers dancing with the babies on their backs, their poor little heads rolling and nodding in time with the drums. It is no wonder that if they grow up they have an inborn sense of rhythm.

Funeral customs, fetish rites, and lawsuits are the occasions that demand the most lavish celebration. Relations and friends help to finance these to make them a success. Ten guineas was offered to me for a medical certificate for a court case by a woman who, one week before, would not spend sixpence for the treatment of a sick child. In another case the family spent twenty-six pounds on the funeral of a woman who had died in childbirth. There was not one penny left to buy milk for the motherless baby.

Family Life

Polygamy prevails. Each man has as many wives as he can afford. The system has obvious advantages, but the disadvantages lie heaviest on the older children, who are often inadequately protected, on the young woman who may be one of the many wives of an old man, and on the young man who has not the means to buy him a wife suitable to his age and inclinations. It favours rape, promiscuity and prostitution, and the spread of venereal disease.

A wife is an investment. A virgin costs about ten pounds. She works for her husband, cooks his food, cultivates his farm, engages in petty trading, and takes it in turn with the other wives to live with him. When advanced in pregnancy she generally returns to her mother, and often stays there until the child is about a year old. She may go back to her husband, or she may contract an alliance with someone else. It all depends upon the proximity and the solvency of the previous mate. She still looks on her mother and her mother's family as her principal attachment. The children are often sent to family headquarters, either permanently or for long periods. The father of the child has some authority over it but in some cases he is far away or untraceable. The most united families are those that live in the remote villages where life is self-contained and primitive.

THE HOME

In an average household the rooms are built round a compound. The furniture is simple, the rooms being largely used for untidy heaps of boxes, tins, bottles, and clothes; while the beds are simply

* Abbreviated from a thesis for the D.M. Oxford.

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mats on the floor. The compound or the verandah round it is used during the day for all household occupations, recreations, and repose. Cooking is done on a small fire or coal pot, meals being prepared by a mammie who squats on the ground or on a low stool. Washing is done and meals are eaten in the same position. Scraps of food that fall to the ground are scrambled for by the children and the domestic animals. Every sort of domestic utensil takes part in the confusion—clean and dirty together, mostly dirty. It is not rare to see a stately negress walking along bearing a few tomatoes, some eggs, and a loaf of bread—all contained in a chamber pot.

In the towns there is a good water-supply and a latrine system, but the innate lack of fastidiousness in all matters of toilet demonstrates the failure of material structures in the face of defective health education. Where water is available, bathing is a routine which is performed with thoroughness and enthusiasm. The babies are well bathed two or three times a day. The clothes are usually clean and well laundered. The children wear no clothes except for the strings of beads and diminutive "tail cloth" worn by the little girls. This nudity renders them very liable to sores and skin infections. The men wear short trunks when working and the graceful and dignified toga during leisure. The women work in petticoats, but in the towns they wear a loose blouse and clothes of gay and varied colours that rejoice the eye. Beads and ear-rings are much studied, and gold ornaments are worn in the hair when it is dressed for ceremonial occasions. At the big festivals the many-coloured umbrellas, dancing and twirling, the gorgeous robes and massive gold ornaments of the chiefs and their followers make an unsurpassable wealth of colour. The Moslem people, though more orderly, are exceedingly dirty in person and in clothes.

In spite of their ablutions the coast Africans do not seem to resent their newly washed clothes or children being soiled with dirt or excrement. A well-born woman will be sitting down when the baby defæcates all over her lap. She will scrape up the stool with her hand and flip it on to the ground, regardless of the domestic utensils and foodstuffs lying about. She then proceeds to wipe her fingers on her cloth, her legs, her chest, with some daintiness.

Food consists mostly of the following articles:—

Group 1.—Cassava, yam, cocoa yam, maize, plantain, sweet potato, spinach (about 40 varieties of edible leaves), beans, peppers.

Group 2.—Bread, rice, bananas, tomatoes, oranges, sugar cane, pawpaw, avocado pear, pineapple, palm oil, ground-nut oil, dried fish and meat, palm wine, soup (okra, garden egg, tomatoes, onion, a little dried fish or meat, much pepper, snails, and edible fungi if possible).

Group 3.—Meat, eggs, fresh fish, sugar, tinned milk, tinned butter.

Group 1 are the most common foods. Group 2 are eaten about once a day, and Group 3 about once a week by the average household, rarely or never by the poorer or more rustic ones, and more often by the wealthy and the townspeople. Milk is unobtainable except from tins. There is practically no cattle breeding south of the Volta, because of tsetse and rinderpest. The goats are never milked.

WOMEN

The African women lactate profusely. There may be some milk in the breasts twenty years after childbearing. The babies are breast-fed well into the next pregnancy, and the older children may be suckled in moments of stress. In an emergency, any of the female relations will suckle a child. The milk is probably poor in quality.

The position of women in the household is important, though it is not true that most West African tribes are matriarchal. The women of the pagan tribe are on the whole more intelligent and responsible than the Moslems—most people would say that the reverse is true of the men. Girl babies are always welcomed as they are a commercial asset, and there are no surplus women. As children they work hard at domestic duties—hewers of wood, drawers of water, beaters of *fu-fu*, and guardians of their younger relatives. Later on they may have fits of violent reaction when they may refuse to help in the house and spend all their time in the pursuit of vanities. Puberty is an occasion of great festivity and they are given in marriage soon after. They are never doomed to spinsterhood, and rarely to an unhappy marriage. If one husband ill-treats them they generally run away and find another. There is not necessarily any jealousy between the wives of the same man. Some writers deprecate the "slavery" of the African women. They certainly work hard and even excessively, so that their childbearing is adversely affected, but I do not think they are unhappy because of their work. They are desperately unhappy if they have failed either in producing children or in any other of their responsibilities.

Pregnancy is a proud achievement. Instead of concealing it the women are delighted to display a tumid figure. Childbirth is generally supervised by the grandmother. If she suspects trouble she gets in the local medicine man. He encourages the patient with exhortations, dances, clapping, and drugs—some of which he may drink himself—sometimes with vigorous manipulations. Cases of obstructed labour are sometimes admitted with the perineum torn, swollen, and pouring with foul-

FIG. 1.—Ashanti women and children. The youngest baby is generally well cared for, while the deposed baby is neglected. Left: elder child (4 years) weighs 17½ lb.; younger (2 months) 10½ lb. Middle: elder (4 years) weighs 21 lb.; younger (13 months) 18½ lb. Right: elder (2 years) weighs 15 lb.; younger (3 months) 11½ lb.

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smelling concoctions, rectal and vaginal medication being violent and inept.

But most labours are short and easy, the average birth-weight of the baby being less than of a European. These small and often premature infants may be ascribed to yaws, malaria, heavy manual labour during pregnancy, and malnutrition. Although most of the women of childbearing age appear well nourished, corpulence produced by an unbalanced diet is malnutrition from the point of view of procreation. The mother is expected to get up on the same day and wash the clothes. The cord is cut at the distance of the child's knee and is dressed with sandalwood, mud, saliva, or some herb, according to the taste of the midwife. The infant is admired, bathed, nursed by any or all of the other inhabitants of the compound. Mother and child remain at home for some ten days. After that the mother dresses in new clothes, ties the infant on her back, and goes out a proud and enviable person, looking and feeling, as the Belgians would say, "très snob."

The woman's position as a young mother is chic but not responsible. Her mother still orders her about and assumes control of the child management. It is most desirable to be prolific. A large proportion of the children die young. The mother's sorrow is acute and dramatic at the time, but she soon recovers and forgets her troubles. She is anxious to go on having children as, when she has passed the climacteric, she will be demoted from the wife class into the dowager class. Though she is then respected in political circles and powerful in family circles, this is a personal misfortune. At the antenatal clinics pseudocyesis is common. Gallant optimists will pay large fees in the hope that they may have a child. "I have been pregnant for three years. Please give me some medicine to make my abdomen enlarge."

In most states a queen-mother is appointed. They are often wise old women, and are treated with great respect; their funerals are celebrated with pomp, gin, and gunpowder, and are second only to those of the chiefs themselves.

Child Life

The first months of an infant's life are certainly its happiest. It is carried about on its mother's back, a position it loves, it sleeps close beside her, it is nourished whenever it cries, and on the whole it does remarkably well on this treatment. Apart from the considerable proportion of neonatal deaths, some 30 per cent. are chubby, cheerful, and bronchitic. An equal number are normal up to about 9 months and perhaps only 40 per cent. show obvious signs of mismanagement.

A woman has a lot of time in which she likes to sit with a baby. First she washes it slowly, lingeringly. Then she alters the disposal of the beads with great precision and leisure. She powders it or makes patterns on it with "wet-white" made out of clay. Any fractiousness on the part of the baby is met with the same diversion—the breast is thrust into his mouth. The mother has no conception of any other way of amusing or pacifying a child. So far the toilet may be harmless. But then, out of idleness, or excessive advice from grandmothers, an enema may be administered. This is a daily routine in some families. It may be given by directly blowing the enema from the mouth of the administrator into the rectum of the recipient. More frequently a bottle neck gourd is employed. A few of these may be seen hanging up in every compound generally near the cooking place. They are used by all the family; they may contain herbs or some crude disinfectant such as izal. They may cause anything from anal fissure to a severe proctitis, and prolapse. They are a fertile method of spreading gonorrhœa.

Every detail of a small baby's physique is examined and considered. A normal fontanelle is constantly reported as a "hole in the head." A normal vagina is turned into a vaginitis "because it is red." Any irregularity of the colour and texture of the skin is worthy of anxiety and treatment. This meticulous care of the small baby is in striking contrast with the neglect and indifference with which the older children may be treated.

The Africans have a great horror of deformities. Children born with a club-foot, cleft palate, &c., are generally deserted or exposed to die. Even a rudimentary extra digit is regarded with something akin to horror. A chief will not have his portrait done anything but full length. To them fractional representation indicates incompleteness. There was nearly a riot in one town because the omanhene's detractors alleged that he was circumcised. Accusations of fraud or criminal propensities would have been far less damaging and subversive. On the other hand the slowly developing ravages of leprosy or some infection are not regarded as repulsive. A man with severe gangosa will marry and have children. One of the most fashionable midwives in Koforidua was a leper without fingers or toes.

FIG. 2.—Two small Hansa boys.

DISCIPLINE

An average child has little or no discipline. He is indulged unceasingly without any attempt to encourage self-control. The mother rarely corrects the child for wrong-doing; she simply smacks him in anger and then she may hurt mercilessly. Some children are sweet-natured and them it is difficult to spoil; most of them are sensible and when they see signs of firmness they become amenable.

Although the mothers are fond of their children they are quite incredibly careless with them; like all primitive people they are lacking in imagination. The baby may be left to a small girl who drops him. He is left near a fire and is horribly burned before anyone notices his screams. As soon as he becomes mobile he is allowed to crawl all over the compound. He stuffs his mouth with all sorts of dirt and rubbish. When one considers that the compound is full of other children and animals with insanitary habits—not to mention the expectorating adults—the result can be imagined. It is no wonder that the average child of 18 months weighs no more than he did at 9 months, that he is pot-bellied and spindle-legged, peevish, helminthic, and in constant abdominal discomfort. The idea that the "simple savage" has instinctive knowledge in caring for her children is without foundation. She is as foolish as the most sophisticated mondaine and she is less educable.

Up to 2 the child leads a thoroughly spoiled life, but this existence is rudely broken. His mother either has another baby or goes away with a husband and leaves the child to his grandmother. He now has a comparatively poor time. There is no one he can claim as his own unquestioned slave. I have seen great rage and bitterness in a child who finds his place on his mother's back is usurped by a new baby. Some of the peevish, ill-considered articles in the local press are clearly a result of trauma at this age. After a period of blind misery the child gets used to this. People are good to him. The Africans never

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talk down to a child. The children may fight and hit each other in anger, but you seldom see deliberate teasing. If they are well treated they grow sensible and are in some ways in advance of their European contemporaries. But there are some that become oafish and suspicious from unsympathetic handling.

In the evening you may see the children—about ten of them—at their meal. There is one large basin of *fu-fu* (pounded yam or cassava) and a small one of soup. Each one pinches off small pieces from the lump. He gently shapes it with his fingers, dips it in the soup, and puts it in his mouth. He delicately licks his fingers and repeats the operation. The whole proceeding is deliberate and mature; there is no scramble or hurry. But their appetites are generally poor. They are given oddments of food at all hours of the day; there is no keen edge to their hunger and no great efficiency in their digestive powers.

FIG. 3.—Mother three months' pregnant. 1st, 3rd, and 4th children died when they began to walk; 2nd miscarriage, 5th (left) aged 3½ years, weight 18 lb.; yaws, malnutrition, worms, scabies, and malaria. 6th (right) aged 1½ years, weight 17 lb., beginning to show malnutrition. Mother considers them normal.

It sometimes happens that a small child strays into my consulting-room by himself. He may have come from "far bush" and have scarcely seen a white person before and certainly not a white woman, but he marches in, walks straight up, leans his elbow on my knee, and exchanges greetings. "What is the matter?" I ask. "I have fever and a pain in my stomach and I have no appetite" he promptly replies. I ask him to point out the position of the pain. He hitches his small toga from his shoulder and with dramatic gestures he gives the details of his condition. The mother enters at this point, runs forward and clasps the child. "Shegbayeh, shegbayeh!" she exclaims, "he is afraid." But as a matter of fact he is neither shy nor afraid until he is annoyed or hurt. Then he is a terror. The children have no instinctive colour prejudice. Sometimes they endure their own ailments, especially if they are chronic, with a patience and stoicism that is nothing short of ghastly.

Half-caste children are usually well treated. Many of them are named from birth with the prefix of *ora* or *awura*, which is an honourable title. This, however, is not an invariable rule. I have known of some who were grossly neglected.

SUPERSTITION

There are many superstitions, customs, and rites which concern childbearing, some of them charming and harmless, some that are damaging. If several children in a family die, the next one is given a disparaging name, such as "It doesn't matter" or "We laugh at death." The child is put under the protection of a fetish, sacrifices are performed, and the hair is allowed to grow long and the appearance unkempt. In some districts radiating incisions are made on the face. In some tribes twins are unlucky and used to be destroyed. In some a baby that survives its mother is regarded as unlucky. Very few of them live long anyhow.

A baby weighing 3 lb. was brought into a clinic. There were fourteen incisions, each 2 in. long, on the abdomen. I asked the father, a local chief, why he had done it. "It is our custom" he replied. "But," I said, "this child is small and weak. You should not have injured her like this." "But it is our custom. The District Commissioner says we must keep our customs." "If your customs are good, keep them," I told him, "but any custom that will hurt a child is bad and you must stop it. If you must cut your children when they are born, make one small cut and finish. Do not kill your children with your customs." The child died, but he followed the advice with the other babies born in his household.

This illustrates the confusion of mind that exists. The missionaries tell them they are pagans—they must abandon all their former ways if they become Christian. The converts proceed to adopt a nominal monogamy, clothes, church-going, medallions of John Wesley or the Sacred Heart according to taste, together with the asseveration of some of the most difficult points in Christian theology. The political administration tells them to keep their customs, obey their chiefs, and establish more firmly their tribal traditions. Life is difficult for these people. But they have a great deal of common sense when it is demanded of them. Their power of judgment is undernourished and lacks exercise.

Mental Characteristics

There are as many opinions on the mentality of the African as there are individuals in Africa. Compared with the white races he seems to lack initiative and constructive ideas, although he may be a shrewd judge of the attainments of others. He has a childlike gift for distinguishing the sincere from the false, the shepherd from the hireling. He is almost invariably dishonest. He wishes to attain wealth without expending too much energy. He does not consider that there is any obligation to honesty beyond the members of his own family. For them he will give up anything he has and steal anything he has not. Outsiders are fair game and are treated with the utmost callousness. He is conventional and loves talking. He will invent all manner of fabricated excuses out of politeness combined with a facile verbosity. Power of observation is astonishingly defective. Cardinall (1931) quotes the instance of "I saw the woman turn into a hyena," whereas you or I would see that the woman did not turn into a hyena. "Their surprising ignorance of nature lore" (Crocker) and their witchbound convictions are the resultant. They are good in an emergency if it is the type of situation to which they are accustomed—otherwise they lose their heads. They seem to be incapable of sustained effort.

The African child suffers from various psychological difficulties. A baby that is indulged unceasingly by its mother has not had the best introduction to life. Weaning is often a time of profound shock. Neurasthenia among older children is common—especially among the school-children. Girls tend to complain of headaches and malaise, especially during menstruation. But life makes little demand on the mentality in the village. These aberrations will have to be considered seriously when education is better organised, to enable the African to take any high place in the economy of nations.

An African has little imagination and little humility. His self-esteem is often ludicrous. And yet he is willing to shelter behind "You can't expect better from a poor African." As long as the courts deal leniently with false statements, the administrators with dishonesty and incompetence, as long as the "humanitarians" go on handing out ill-considered bouquets to mediocre performers, so long will Africa have a real cause for complaining of her treatment at the hands of the "civilised" community.

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As a matter of fact, it is impossible at present to assess the capabilities of a race that suffers from so many physical and psychological hazards. Some of the intellectual qualities of the African that delay his progress, lack of initiative, the servile acceptance of superstitions and customs, many of them fantastic and damaging, his propensity to prevaricate and to defraud, may be ascribed in part to some dietetic imbalance, and some to imbalance of upbringing.

FIG. 4.—The central child was born in Kumasi, and attended a weighing centre where advice was given about diet and prevention of disease. The two others came from distant villages where they had been brought up on the ordinary native diet.

It is certain that many children come into the hospital intensely peevish and/or lacking in initiative to the point of katalepsy and leave it at the end of a few months on a good diet boisterous and responsive as a normal child. Those qualities of docility and tractability, so vaunted by the educationists, will, I hope, be largely modified in future.

I have seen enough of the excellent qualities of the Africans—their good nature and cheerfulness, their astuteness, their uncomplaining fidelity, their patience in very great trials—to know that they are worth educating. The qualities most in need of education are observation, imagination, and judgment. There is much too that can be learned by those Europeans who are fortunate enough to spend much time with them. To the transient white man the African is a worthless baboon. To the static neighbour he is a good friend. When we have learned more from the African mentality I believe we shall be nearer achieving that most difficult objective—discipline without frustration.

Diseases

The diseases from which the children suffer are exactly those that might be expected from the mise-en-scène.

Malnutrition is the most serious problem. The diet mainly consists of bulky carbohydrates and lacks proteins and animal fats. Mineral deficiencies may prove to be considerable. In spite of profound degrees of malnutrition, the orthodox deficiency diseases are rare. A condition known as *kwashiorkor* is found among the children under 5 (Williams 1935). Improved knowledge of nutrition is, I believe, one of the supremely important factors for progress. Malnutrition kills off many of the children and it reduces the stamina of the adults so that they fall easy victims to pneumonia, tuberculosis, &c. Improved nutrition will do more to raise the standard of health and of living than any amount of medication, isolation mania, sanitary plumbing, prenatal mensuration, and operating-theatrical measures.

Malaria is very prevalent. It is most damaging to children between 3 months and 3 years of age. If the child survives—with or without treatment—some immunity is acquired. Most adults live in symbiosis with their parasites and only suffer from attacks of fever if they are overworked, chilled, or malnourished.

Intestinal diseases, gastro-enteritis and the dysenteries, cause a vast mortality and morbidity. Their incidence can be much reduced by health education. Helminthiasis, especially ascariasis, is equally common and equally damaging to the children. Their intestines are so irritated by worms, inflamed by enteritis, excoriated by pepper and by purgatives, assaulted by enemata, damaged by past diseases, and distended with coarse, bulky carbohydrate food, that they altogether lose the power of assimilating the evasive nutrition of their contents.

Yaws is very prevalent in the "bush." It is becoming rare in the towns where injections can be obtained cheaply and regularly. I believe it will yet be proved that yaws is responsible for many stillbirths and neonatal deaths. Ulcers and skin diseases proceed from malnutrition, dirt, and infections; they are essentially preventable.

Pulmonary complaints form the largest "causes of deaths" in the annual reports. In most cases pneumonia is the terminal condition in malnutrition, helminthiasis, enteritis, &c., and is a symptom rather than a cause of death. Obstetric deaths and morbidity are considerable. They will not be reduced by very much until it is realised that domestic is just as important as pelvic economy. Gonorrhœa is common and is responsible for a great deal of sterility.

Some conditions are remarkable for their rarity. Among these are surgical conditions such as appendicitis and osteomyelitis, acute rheumatism, carcinoma of the breast or uterus, and allergic conditions. More research on the ecology of disease would lead to great advances in knowledge.

Conclusion

Colonial government aims at the amelioration of life for the indigenous and the increase of general prosperity. Many claim that the "simple savage" is happier if his condition is left unchanged. This is very possibly true, but no force on earth can prevent civilisation from spreading its tendrils. The most that colonial government can do is to prevent exploitation by pruning the predatory tendrils and by encouraging the growth of those that seem beneficial. There is nothing that civilisation has to offer which is better than the welfare of children.

Over-population is a bogy to numbers of theorists. It is not likely to become a practical menace. Improved living conditions mean improved self-respect. This is not a quality that leads to reckless propagation. The best educated countries are those with a small birth-rate.

The function of a government medical department is to raise the standard of living rather than to supply orthodox medical attention for the individual. After working in West Africa for seven years the following credo seems to assert itself with clarion emphasis:—

1. The greater part of the ill health is preventable.
2. The care of children in the toddler stage is of supreme importance.
3. Improvement can only be effected by health education for the population and by the training of efficient health visitors.
4. Continuity of policy and of personnel is essential to success. An African will take a bottle of medicine from a stranger but he will not take advice. He may listen to his instructions but he will not ask questions.

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5. Preventive work must go hand in hand with curative in order to obtain the confidence of the people, adequate care of individual children, and the efficiency of the health workers and the medical services as a whole.

6. Maternity and gynæcological work are needed. By themselves they are of limited value. In spite of their popularity they should not be allowed to overshadow the importance of the other aspects of welfare work.

7. Coöperation with the agricultural, the animal health, the education departments, and with the political administration is necessary to teach the population what to grow, how to prepare it, and how to spend their money and conduct their families with the greatest contentment.

In order to illustrate this type of work the figures from Kumasi (population 30,000) may be quoted. I take no credit for this work, as I was only in Kumasi for 17 months. The clinic contained 25 beds for sick children and maternity cases. The staff consisted of 1 woman doctor, 1 European sister, 1 European trained health visitor, 2 African untrained health visitors, 2 African trained nurses, 9 African nurses in training, 3 African trained midwives, dispenser, clerk, cook, washerman, and 3 labourers. During 1935 some 800 cases were treated as in-patients—major operation cases had to be transferred to the general hospital. There were over 17,000 attendances of sick children and 11,000 of antenatals—only 25 per cent. of these attendances came from the town itself. In the eight weighing centres in the town there were 35,000 attendances. These centres were conducted by health visitors and nurses. Sick children from the centres were referred to the doctor at the clinic. Those who were diligent in following the advice about diet, play-pens, mosquito nets, and child management in general were charged nominal fees for medicine. The reverse would be penalised, or threatened with financial extortion. It was found that a small fee in most cases was a good therapeutic measure, though of course there were exceptions. Over £1000 was paid into the treasury in fees. Mothers and other members of the family stayed in the hospital with those admitted and thus had constant demonstration in nutrition and child management. The nurses in training were learning preventive work in the weighing centres at the same time as their curative work in the clinic.

The "survival of the fittest" has become a clumsy and incompetent cliché. It has practical value only as long as man has purely animal ambitions. The fact that a child survives an attack of pneumonia at three years old does not mean that he will be any better as a labourer or as a lawyer. It does not even necessarily mean that he is more fit to survive another attack of pneumonia. Conditions that kill the weaklings are also conditions that may make weaklings of the strong. The resiliency of nature is such that if a weakly child is assisted over the difficult and stressful years of growth he may become just as robust as the child that flourishes consistently. Hardship is of only limited value as a trainer of body and mind. A body cannot develop strength if it is starved of proper nourishment. Character and mentality can only develop originality and detachment when purely somatic needs are not importunate.

Nature uncontrolled is no more considerate than an earthquake in eliminating the unfit. It would seem to be more desirable to try to ensure that those who survive shall be fit.

I have to thank the Director of Medical Services, Malaya, for permission to publish this article.

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MEDICINE AND THE LAW

Privy Council Decision on Use of Radiography

THE judicial committee of the Privy Council delivered an interesting judgment on Dec. 21st in Sabapathi *v.* Huntley, an appeal from Ceylon which in part turned upon the medical practitioner's duty to advise a radiographic examination. Mr. and Mrs. Huntley met with a serious motoring accident and were taken by car to the Karanawella Hospital. The car stopped first at the bungalow of Dr. Sabapathi, the district medical officer, which is close to the hospital. He was informed of the circumstances, directed the party to proceed to the hospital, and visited the patients there soon afterwards. Next day he paid morning and afternoon visits, in compliance with a rule obliging him to visit each patient in a paying ward twice a day. On the second morning after the accident Mr. and Mrs. Huntley were driven home. Two days later Mr. Huntley wrote a letter to Dr. Sabapathi, briefly asking for his hospital bill soon "as we sail so early," and adding "we are both very much better and grateful for the way in which we were looked after at Karanawella." After a few more days Mr. and Mrs. Huntley, being in Colombo, arranged to see Dr. De Silva, a specialist, who advised an X ray examination which disclosed fractures. The patients went into the Fraser Nursing Home and remained 45 days under Dr. De Silva's treatment. While in the home Mr. Huntley wrote to the director of medical and sanitary services at Colombo a letter making what he called "a very strong complaint against the negligence and incompetence of the district medical officer at Karanawella." He said that, on their arrival at the hospital on the night of the accident, the district medical officer "after a very perfunctory examination pronounced definitely that no bones were broken, and, without any suggestion whatever of an X ray examination in Colombo, put us in charge of the acting matron in the paying ward and actually intimated that we might leave on the following morning." The letter went on to describe the subsequent consultation with Dr. De Silva and the radiograms which disclosed that Mrs. Huntley had a fractured arm and pelvis, while the writer was found to have a fracture below the shoulder. The letter vigorously condemned Dr. Sabapathi's failure to examine or take proper interest in his patients, and called for strong action. Mr. Huntley, without giving Dr. Sabapathi any chance to explain or justify his conduct, sent a copy of this letter to the chairman of the Kelani Planters' Association. The association discussed it at one of its meetings and passed a resolution endorsing its terms. The letter, discussion, and resolution were published in several Ceylon newspapers. Meanwhile Dr. Briercliffe, the director of medical and sanitary services, had referred the letter to Dr. De Silva for report. Dr. Briercliffe eventually sent the Planters' Association a reply to the effect that Dr. De Silva reported that the underlying injuries had been incapable of definite diagnosis without X ray examination. Dr. Briercliffe went on to say that Dr. Sabapathi regarded Mr. Huntley's letter as libellous and that he himself thought the allegations of gross neglect and carelessness could not be substantiated. If a suitable apology were made to Dr. Sabapathi, Dr. Briercliffe would advise Government not to allow Dr. Sabapathi to resort to legal action. Dr. Briercliffe referred to the fact that Mr. Huntley's letter had alleged other cases of complaint against Dr. Sabapathi; he asked

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that these or similar cases be brought to the notice of Dr. Sabapathi's official superior. About a fortnight afterwards Mr. Huntley interviewed Dr. Briercliffe and stated that Dr. Sabapathi on the night of the accident had examined Mr. and Mrs. Huntley while still in the car on the way to the hospital, and that the examination in each case lasted only half a minute or so. On these statements Dr. Sabapathi brought an action for slander against Mr. Huntley; on the copy of the letter sent to the Planters' Association he brought an action for libel. The district judge gave judgment for the plaintiff, accepting the evidence of Dr. Sabapathi and his witnesses and rejecting that of Mr. Huntley and his witnesses. He held that the plea of justification failed and that the letter to the Planters' Association was not privileged; if, however, it was to be deemed a privileged occasion, then he held that the defendant was actuated by malice in making the communication. On appeal the Supreme Court of Ceylon reversed the decision, holding that the plea of justification had been made out and that, while the letter to the Planters' Association was not made on a privileged occasion, the communication was not maliciously made. The Privy Council has now restored the judgment of the district judge. It holds that the views of the district judge, who saw and heard all the witnesses, should not lightly be disturbed and that the complaints of incompetence and negligence are antecedently improbable. It was in evidence that members of the Planters' Association were not slow to make complaints of medical inattention on the smallest provocation. It was unlikely that the plaintiff and his witnesses had conspired to commit perjury. It was not till his interview with Dr. Briercliffe that Mr. Huntley complained of Dr. Sabapathi having made no examination in the hospital ward. As to the plaintiff having said that no bones were broken, it was significant that the contemporaneous record of the bed-tickets showed not "no fractures" but "no signs of fracture"—an important difference.

Dealing with the medical aspect of the case, the Privy Council said that the pivotal charge made by Mr. Huntley against the doctor was the failure to recommend the patients to undergo X ray examination. The Supreme Court of Ceylon seemed to adopt the defendant's contention here—namely, that after a motor accident, the attending physician must advise resort to a radiologist, and, if he omits to do so, he displays both incompetence and negligence. The Privy Council observes that this proposition is too wide.

> "An X ray examination must always be a question of circumstances—depending, for example, on the condition of the patient, the character of the injuries and the accessibility of the apparatus."

Dr. Sabapathi had allowed the patients to go home, instructing them to let him know how they progressed. Had their pain and other symptoms continued a week afterwards he would no doubt have advised an X ray examination. But Mr. Huntley's first letter had declared them to be much better. Dr. Sabapathi could not be blamed if, assuming the worst to be past and that Mr. and Mrs. Huntley were sailing for Europe, he thought no more of the matter. The Privy Council remarked that no witness had been called by the defendant to affirm that a delay for a week, to await developments, before advising an X ray examination, rather than advising such an examination at once, would per se constitute negligence or incompetence on the part of a physician.

This judgment by the highest tribunal should presumably be regarded in the light of conditions overseas where, in the circumstances of the particular case, the local hospital equipment was presumably imperfect. It would be unsafe to apply it to conditions in England where the resources of radiology are likely to be available at no great distance. The element of availability is brought out in many of the American cases cited in "The Roentgenologist in Court," reviewed in THE LANCET of Dec. 11th (p. 1382). In America several State courts have dealt with issues of negligence ranging from failure to use X ray apparatus to failure to have the apparatus available. The author observes that a physician in or near a city where X ray facilities exist is more likely to be considered negligent for not using them than another physician with an isolated country practice. In any case a physician armed with a radiogram is in a much better position to defend himself than one who must rely on less certain evidence.

The Bar and the Coroner's Qualification

The annual report of the General Council of the Bar mentions that the Council has lost no opportunity of pressing the view that a legal qualification is essential for the office of coroner. For some years after the amending Act of 1926, it continues, the London County Council required the dual qualification (legal and medical) from candidates for its coronerships; the report of the Departmental Committee in 1936 recommended that the qualification should in future be legal only, though, wherever possible, the appointee should have had experience as deputy coroner and should have a knowledge of forensic medicine; last year the L.C.C. resolved that in future only barristers and solicitors would be eligible for appointment as coroners in London. In this statement of the position the Bar Council seems not to be emphasising what was previously understood to be its attitude—namely, not only that the legal qualification should be essential but that any additional qualification in medicine should be discouraged.

The 1926 Act was the first to insist upon any professional qualification at all. A statute of 1354 declared that the county coroner should be chosen from the most meet and lawful people (*de plus covenables et plus loialx gentz*) in the county. This stood till the Consolidating Act of 1887, along with the ancient requirement (which survived till 1926) that a county coroner should have land in fee in the county. The last edition (1927) of Jervis on Coroners stated that out of some 340 coroners in England and Wales 300 were lawyers, 30 were medical men, and the remainder were chiefly medical men who were also lawyers. The figures given in the Departmental Committee's report in 1936 were 268 barristers or solicitors, 37 medical practitioners, and 4 without any professional qualifications; a few of those classed as barristers or solicitors also, according to the report, possessed medical qualifications. The Bar Council, it will be seen, wants the law changed in order to exclude the medical qualification. The London County Council, disregarding any element of *ultra vires*, is acting as though the law was already changed. The public at large may still agree with the view expressed by the editor of Jervis that, although some knowledge of medical terms and the principles of criminal law is necessary for the proper discharge of a coroner's duties, the chief requisites are the possession of tact, sound discretion, practical sense, sympathy, quick perception, and a knowledge of human nature.

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A HOSPITAL NEAR TERUEL

WE have already published two letters describing the work of the British ambulance unit of the Spanish Medical Aid Committee. The following are extracts from letters sent to a friend by Dr. R. S. Saxton, who is in charge of a hospital on the Aragon front near Teruel.

"We are having on the whole a much stiffer time than last winter. The cold has been more severe, and we have continual bursts of rain and very little sunshine. Also there is the constant strain and racket of the enemy air-raids and bombings which sometimes badly affect the morale and nerves of the staff. I am director of one of our latest hospitals—since we came to Spain the Spanish Medical Aid Committee have organised over 40 on the different fronts.

"When we first arrived at our present and now certainly not dismally unpromising quarters everything seemed to be in inextricable muddle. But somehow our personnel sorted itself out with a magic rapidity and in a few hours some sort of practical working routine was achieved. One team of nurses prepared two operating theatres, and the steriliser was alongside with his autoclaves. Another team had rigged up two decent, neat wards to accommodate a hundred patients. The electrician had been hard at work, and much spade work—in every sense—had been accomplished as well in the way of air-raid refuges, refuse pits, and some attempt at making up the roads, in our immediate vicinity at least. I myself secured a moment to install my blood transfusion instruments, in a curtained-off section. The dentist and the oculist seized the most suitable corners available for their activities. Last, but certainly not least, the cook and his helpers were unloading and arranging themselves and their stuff where best they could be planted down.

"Everybody has put his shoulder to the wheel with marvellous energy and good humour. But all the same, the staff is having a pretty grim time. We sleep on floors, rough barrack room boards. The food consists largely of beans, macaroni, and oil. We have not yet been able to do much in the way of adequate water-supplies and sanitation, and have been up against influenza and other epidemics. Thanks however to the fine team-work, patience, and courage of everyone concerned, we have risen fairly triumphant over our difficulties. I have managed to set up a small canteen in the hospital, which makes for social cheeriness, an essential asset. Patients as well as staff can obtain there some of the serious necessaries and small comforts such as shirts, eau-de-Cologne, needles, flash torches, cigarettes, and whatever light refreshments we can rake together. There is a great dearth of cigarettes—we could well do with a few thousands to have on sale. The canteen is bringing in about 1000 pesetas per month; not much, but still I am glad to have it in hand when there is a call for some urgent hospital requisite.

"Since we so often have to make a hasty evacuation one of our main drawbacks is a shortage of transport. At best we have to pack up in a hurry with nothing like enough packing space at our disposal. This often means tragic destruction to our valuable instruments, shaken about on villainous roads. My own precious typewriter has come in for considerable battering, but fortunately so far only the case has been damaged.

"I am very disappointed to have to curtail to a great extent my work on blood transfusion,[1] more especially as I was just then on the track of some of the newest developments in Russia, and I was once more in contact with the able assistant I had out here last summer who is as keen on the work as I am myself. The material required for these new experiments is costly, which makes progress slow. Before I took on this new work that obliged me to put the experiments aside we had already acquired a deceased ambulance, which we converted into a large travelling laboratory where I can collect and analyse my material bit by bit, as occasion and funds allow."

[1] See *Lancet*, 1937, 2, 606.

BUCHAREST

(FROM OUR OWN CORRESPONDENT)

A QUESTION OF RACE

THE Association of Rumanian Christian Physicians resolved at its recent meeting to demand that in the future public health law the Rumanian Christian characteristics shall be clearly defined, in order that vacant medical positions shall be filled only by racially pure Rumanians. A deputation called on the Minister of Health requesting that in filling the five vacant positions in Bucharest and the chief posts in venereal dispensaries, the racial principles shall be given full consideration. The association appointed a statistical study committee, which will collect data about the positions of ethnical Rumanian physicians in private and State institutions.

PURITY OF RACES

Some of the most eminent anthropologists of the world attended the Seventeenth International Anthropological Congress held recently at Bucharest. The greatest interest was aroused by the statements made by Eugene Pittard, professor in the University of Geneva, whose chief work on races in history clearly demonstrates that theories about the purity of certain races are untenable. At the congress he said that there is a great injustice to science when racial theory is applied to political and social life. The world war was caused not so much by economic necessity as by an exaggeration of the racial theory. A powerful European nation was misled by its leaders who inoculated into their brains the false idea that they belong to a pure race having a great mission. The Aryanism that is now going forward with great parade in that land, he went on, originates in the same delusion and may lead to the same results. This conception of a pure Aryan race is ideological and has no anthropological basis. It merely encourages racial hatred to state that nations can be divided into "select" and "first rate" groups. The history of the world shows again and again the rise and fall of a people who once reached the acme of civilisation. Every anthropologist knows, continued Prof. Pittard in a private interview, that the white peoples are not of a higher order and are by no means necessarily called to rule and to boast of the achievements of their civilisation. Innumerable proud civilisations have disappeared one after the other. Sham science confounds language with race; there is no pure Latin race, just as there is no pure German race. Between the Bavarian and the Pomeranian Germans there is as much difference of temperament and tradition as between the Mediterranean and Nordic nations. There are a few races free from any mixture with other blood. This is only because nobody has yet taken the trouble to disturb them. If, say, oilfields were found on their territory, surely "civilisation" would already have taken pains to annihilate them. Anywhere a strange race sets its feet blending of blood takes place.

Prof. Henry Berr, another prominent anthropologist, told us that there is no race that has not absorbed the most diverse ethnical elements. The

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Saxons that are making a show of their Aryan purity have amalgamated with Celt and Slav elements. Civilisation is the better, and has greater creative power, because there is just this diversity in its building up. An instructive example of this is the ancient aristocratic families, where mixing was difficult on account of class prejudices, and therefore they always showed signs of degeneration. The mingling of races, as much as the economic, commercial, and mental links, has contributed to the spreading of universal culture, and cannot therefore be regarded as a disaster.

SULPHANILAMIDE IN GONORRHŒA

In the experience of Dr. Joan Máté, director of the venereal dispensary in Oradea, sulphanilamide has proved effective in simple and complicated gonorrhœa as well as in other urinary infections. In simple cases he administered this drug in the form of instillations in support of the internal treatment. This he did by diluting the injection fluid at the rate of 1 : 2 or 3, and this method also proved beneficial. Though he does not claim that it cures gonorrhœa as promptly as the Americans allege, yet he is very satisfied with its action, since in a quarter of the cases there was complete cure, without any local treatment, while in many others it produced a smooth resolution of the affection. He administers a tablet three times a day, and only exceptionally does he exceed this dose, the maximum being six tablets a day.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

THE POPULATION OF THE UNITED STATES

THE Bureau of the Census has released an intercensal estimate of the probable population of the country as of July 1st, 1937. This stands at 129,257,000, or an increase of 828,000 over 1936, and 6,482,000 over 1930 (the census year). This represents a relatively small percentage increase over the preceding year (0·64) and an increase of 5·28 per cent. in the seven years since the census was taken. Slowing in the rate of increase, at least for the preceding few years, is manifest.

INFANCY AND CHILDBIRTH AMONG NEGROES

A report by Elizabeth Tandy from the children's bureau of the Department of Labor shows that more than 250,000 negro infants are born alive each year in the United States, about two-thirds of them in the rural areas of the south. In every section the mortality-rate is greatly in excess of that for white infants; furthermore the death-rates are, on the whole, higher in urban than in rural areas. Next to natal and prenatal causes, the most common causes of death are respiratory diseases, gastro-intestinal diseases, and epidemic and communicable diseases. The total rate, however, has decreased greatly in the last twenty years, most of the decrease being between the second and the twelfth month of life. Maternal mortality among the negroes is also far more common than among white women. In fact in several of the States the rate from puerperal causes for negro mothers is more than double that for white mothers. The downward trends in the mortality-rates for mothers and infants are probably due largely to the gradual adaptation of the negro to his environment and to the increasing healthiness of the communities in which he lives.

PNEUMONIA MORTALITY

According to the experience of the last six years, the chance of a given death being due to pneumonia is approximately 1 in 14. When the deaths from this cause are combined with those caused by influenza, the total ranks close to second place as a cause of death in the United States. McGill has recently reviewed the death-rate in various parts of the country and attempted to correlate these with the facilities for typing pneumococci and for giving specific serum. This problem is important since it is estimated that there are approximately 175,000 cases and 38,000 deaths annually from pneumonia due to pneumococcus of Type 1 or 2, for which specific sera are available. Several States have definite pneumonia control programmes, but in general the facilities for pneumococcus typing and the actual utilisation of these facilities is not as great as is desirable. It is hoped that the high death-rate from pneumonia can be reduced by more active measures of typing and specific serum administration.

EPIDEMIC DIARRHŒA OF THE NEW-BORN

Headlines in the daily papers of late have been much occupied with a small epidemic of diarrhœa among new-born babies in Chicago. The subject is one, however, of much graver concern than this particular outbreak might imply. It has troubled public health authorities and pædiatricians in New York City as well as in Chicago and other cities for the last three years.

In October two of New York City's epidemiologists, Dr. Samuel Frant and Dr. Harold Abramson, presented to the convention of the American Public Health Association tables and charts derived from the city's morbidity and mortality data for the last ten years as well as the results from a special-study of the post-natal course of 4594 live-born babies. The first recognised outbreak of this very fatal intestinal infection was in the summer of 1934, and since then Frant and Abramson have observed 23 such outbreaks in 15 hospitals. A description of the disease written in collaboration with New York's Health Commissioner Dr. John L. Rice and Dr. W. H. Best appeared in the *Journal of the American Medical Association* of August 14th. The January issue of the *American Journal of Public Health* will contain the epidemiological study together with table and charts. The latter indicate that whereas deaths from diarrhœa in the age-group 1 month to 1 year have consistently declined during the last ten years, there has been no such decline in the mortality from diarrhœa in the first month of life. Since 1931 the death-rate from diarrhœa among the new-born had indeed been rapidly increasing.

In New York City 711 cases of the disease are known to have occurred since 1934, of which 335 (47 per cent.) were fatal. The disease has so far been recognised in ten cities on the North American continent. It has also been reported from Edinburgh in Scotland and from Garches in France.

ANATOMICAL CRITERIA OF DEFICIENCY DISEASES

The American Chemical Society gave another indication of the breadth of its interests when it invited Dr. Gilbert Dalldorf, pathologist and director of the laboratories of the Grasslands Hospital, to take part in a symposium on the vitamins at a meeting in New York City on Dec. 11th. Dr. Dalldorf told them that pathologists had recognised deficiency disease long before the discovery of the vitamins. The pioneers, however, had been handicapped by the facts (1) that in man deficiencies are usually complex,

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and (2) that the fatal outcome is almost always due to a complicating acute infectious disease. Discovery of the vitamins has made possible an application of the experimental method and in several instances the pathology of vitamin deficiency has now been resolved into fundamental specific effects on certain tissues.

Vitamin A was at first thought to be anti-infectious but closer observation shows that the deficiency lesion is a change in epithelium. The deficiency can be determined, probably as soon as stored vitamin A is depleted, by examination of vaginal epithelium cells removed with a swab. The observed infections are secondary to epithelial change. Irritation will produce metaplasia if the vitamin-A intake is low, and so will theelin (œstrin); but neither will do so if the diet is ample. Epithelial metaplasia is the specific effect of vitamin-A deficiency. The old observations of the association of metaplasia and night-blindness with liver disease now have a new meaning.

The group of vitamin-B factors Dr. Dalldorf described as a Waterloo of pathologists. He did point, however, to a lesion of the bowel, described fifty years ago as colitis cystica superficialis, as being the product of a vitamin-B deficiency.

Vitamin-C deficiency again has a clear pathological picture presenting a change in the nature of the intercellular material of the skeletal tissues. In deficiency these materials remain fluid; within 24 hours of the administration of vitamin C they solidify. The value of vitamin A as a biological tool in the study of epithelium is matched by the possibilities in the use of vitamin C in studies of intercellular materials.

THE LENGTH OF LIFE

Even within the relatively short period covered by available records changes in life expectancy in this country have been remarkable. Dorn (*Publ. Hlth Rep., Wash.* Dec. 3rd, 1937) states that in 1930 the expectation of life at birth was 59 years for white males and 63 for white females in comparison with 48 and 50 years for negro males and females respectively. As recently as a hundred and fifty years ago, at the close of the Revolutionary War, the expectation of life at birth in the United States was approximately 30–35 years. By 1930, in Massachusetts, it had increased by about 26 years for females and 24 years for males. This increase apparently affects almost all ages except those over 50, but has been most rapid in childhood, adolescence, and early adult life. The trend has even been accelerated of late years, and the increase in expectation of life since 1900 is equal to the increase in the previous hundred years. Curiously enough, since 1930, negro males between 20 and 50 years of age have suffered a loss of expectation of life of nearly 3 years at every age. Perhaps strange is the fact that the increase in expectation of life at birth since 1900 in the white population has been about 60 per cent. greater among urban residents than in rural communities. The areas of high mortality in the white population are in the south-west—which fact may be partially explained as due to the inclusion of Mexicans, Indians, and invalid persons—and along the Atlantic coast from Maine to Florida. The greatest expectation of life is found in the north-west. As Dorn points out, the remarkable increase in expectation of life since 1900 cannot be repeated in the next generation unless methods are developed for prevention and control of the diseases of middle life and old age. It has been estimated that the ultimate longevity obtainable with present knowledge is about 70 years, or only about 10 years more than it was in 1930.

PARIS

(FROM OUR OWN CORRESPONDENT)

THE 40-HOUR WEEK IN HOSPITAL

Dr. Georges Duhamel, an obscure physician but an eminent man of letters, threw an apple of discord into the Academy of Medicine the other day when he devoted his maiden speech to the effect of the 40-hour week on hospital services. Yet the problem seems to be one not so much of hours as of the spirit of the personnel, from top to bottom. Most of us are feeling disgruntled nowadays over some aspect or other of our work, and with prices rising daily and the uncertainty of balancing the budget it is difficult to face the present hospital situation with an unruffled mind. In a few months, when the necessary administrative adaptation to the requirements of the 40-hour week has been made, it will be much easier than it is at present to appraise this revolution at its true value. To vary President Lincoln's famous dictum, it is well not to vet a horse while it is fording a stream.

We are on surer ground when we consider hospital finance. Hospital budgets were recently discussed by a late Prime Minister, Monsieur Herriot, who as Mayor of Lyons could produce some painful home truths about the cost of hospital administration. Be it noted that until 1918 the hospitals of Lyons were unique in France in that they balanced their budgets out of their own resources. Since then the cost of living has risen enormously, as have the numbers of persons employed. On Oct. 1st, 1937, the Grange-Blanche Hospital in Lyons sheltered 1565 patients and was served by 1504 persons, of whom 236 belonged to some religious order, 156 belonged to the medical staff, and 1112 were lay workers of various descriptions. In other words, to every patient a hospital attendant, or nearly so. In 1920 the budget of this hospital was balanced with a modest 4,300,000 francs. The corresponding figure for 1926 was 10 millions, for 1936 it was 12½ millions, and Monsieur Herriot hazarded the guess that 18 million francs would be required to balance the budget of 1937. At the present time the cost of caring for a patient in a medical ward is 48 francs per day, and in a surgical wards 50.50 francs per day—bigger sums than those charged in certain private clinics. Good socialist that he is, Monsieur Herriot did not so much as breathe a hint as to going back on the 40-hour week, but he wondered if one could not work a little harder during each of these 40 hours!

EXCHANGES BETWEEN FRENCH AND ENGLISH DOCTORS

Bulletin No. 36 of the Association pour le Développement des Relations Médicales entre la France et les Pays Étrangers (address: Salle Béclard, Faculté de Médecine, 12, Rue de l'École-de Médicine, Paris) contains a note on the organisation of family exchanges between French and English doctors under the auspices of Monsieur Marois of the French railway system. The idea is that French doctors should spend a few weeks in the homes of English colleagues, and vice versa. The coöperation of the French railway system in this scheme takes the form of a 40 per cent. reduction in railway fares. This system of exchanges has already been put into operation on behalf of others than doctors.

The same number of the bulletin contains a notice from the rector of the University of Paris concerning the reorganisation of the Office du Tourisme Univer-

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sitaire which is to have in each French university a fully qualified representative to deal with travelling and other activities of the students. It is hoped that this body will satisfactorily replace the agencies with more or less thinly disguised commercial aims, and will organise during the holidays group visits between members of the different universities. Ultimately there should be a useful network of lodgings available for students throughout France under the auspices of university authorities.

THE HEALTH OF FRANCE IN 1936

Prof. Tanon's report to the Academy of Medicine on infectious diseases notified in 1936 was on the whole reassuring. What was surprising as well as reassuring was the statement that the part France has had to play as a more or less involuntary host to thousands of Spanish refugees has not involved it in any serious epidemic in spite of the appalling destitution of many of the Spaniards. Scarlet fever has diminished considerably, the notifications for 1936 numbering only 4876 as compared with 5071 in 1935, and 6920 in 1933. On the other hand there has been a considerable rise in the number of notifications of measles. But although as many as 8979 cases were notified there were only 214 deaths from this disease. Typhoid fever seems to have behaved patchily during the year under review, and while there was a substantial decline in the Seine-et-Oise areas, the French littoral was worse off than ever, thanks probably to the conchological propensities of the natives whose taste for raw shell-fish needs correction. With regard to infantile paralysis, which is on the decline, Prof. Tanon advised the public health authorities not to be too exigent in demanding very early diagnoses, for in this disease any hustling of the medical profession only means a crop of notifications with a high proportion of errors. In the Seine area, for example, only 41 out of 51 diagnoses of infantile paralysis stood the test of time and mature clinical observation.

SELF-ADVERTISEMENT AT MEDICAL CONGRESSES

Dr. J. Noir, the director of *Concours Médical*, dissects with nimble rather than merciful fingers the motives prompting many doctors to contribute papers to medical congresses. The very title of his editorial (Les Abus d'une Publicité Médicale Licite: Les Congrès) gives more than an inkling of what is to follow. "Many communications are made with the sole object of giving publicity to the name of the author, who usually does not care a rap for the opinions that may be formed of the value of his work provided his name appears in print . . . and that this publicity will bring him some patients." Whereupon Dr. Noir proceeds to disillusion the aspirants to such publicity by pointing out that the very number of medical congresses and reports thereto assures their neglect in the columns of the medical press. Even to print the titles of all such communications would be a physical impossibility for the medical journals. The pity of it all is that the few valuable communications are apt to be drowned in this spate of self-glorification. Dr. Noir's device for sifting the corn from the chaff is to recommend the former to the good services of medical societies in which its value can be fairly appraised after expert discussion. In other words, the select medical society is the best forum for the recognition of serious work, whereas the more pretentious medical congress is apt to be a snare and a delusion, not least for the would-be self-advertiser.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A BACTERIOLOGICAL BACK-NUMBER

II

I HAVE recently been talking to a number of young men who have been up for their final M.B. examinations. They were showing signs of overstrain in body and mind and they did not scruple to voice their dissatisfaction with the demands that had been made upon them. There can be no doubt that if something is not done about it the exactions of the modern medical curriculum will break down under its own clumsy weight. More and more load is being put on and practically nothing is being taken off. The aspirations of youth are insuppressible and the human mind almost miraculously resilient and thus as yet we see only the strain and avoid the breakdown. Our young medical men, thank heaven, can still make shift to keep their interests wide and to retain some small measure of self-determination. Yet teacher, examiner, and the student himself seem to have been caught up in a circle which all agree is vicious yet nobody seems able to break. The purely technical aspects of the medical training seem, as time goes on, to get more and more exacting and all-consuming until there is a real danger that the wider cultural elements may be squeezed out.

* * *

The evil starts before medical education, as such, is formally begun. It is now almost the rule for the boy taking up medicine to begin seriously to prepare for medical examinations when he is not more than 15 or 16 years old. There is no doubt that the scientific subjects as taught to first M.B. students are quite an unsuitable diet for a boy under 18. As it stands it is intellectually and morally vitamin-deficient. Necessary though science may be in the training of the finished doctor, it is only one of the elements which must go to the making of that strange compound. No branch of medicine has yet reached the stage of cold rationalism when the judgment and sympathy of its practitioner can be dispensed with. A doctor must more than ever before be what Locke calls a "whole, sound round-about" man. We want more science in medical education but we want a good deal more than science. As a modern poet has said, "a refined man will never become vulgarised by science, but it seems very clear that science can never refine the vulgar." Of what the preliminary school training should consist it is not for the purely medical teacher to decide; it probably matters little what a boy learns provided it be sufficiently broad and humanistic. One wonders whether there can be any substitute for the study of the Greek and Latin spirit. Perhaps when the snobbery of the old classical tradition dies down we shall reinstate the study of the Greek spirit without demanding the mastery of the ancient language. We are content to study our Old Testament without learning Hebrew. I wonder

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why we should be so shy of reading Plato because we know no Greek.

* * *

It is not only in the curtailment of school education that the modern impatience with all but the most technical parts of the medical education shows itself. As illustrating the gradually constricting outlook we may instance the recent history of the natural science tripos at Cambridge. Before the war the great majority of medical students took honours courses in one or more of such subjects as botany, chemistry, and zoology. Now few are interested in any subject that is not part of the bread and butter of medical practice. The modern student is even impatient of such semi-professional subjects as pathology, biochemistry, or pharmacology. Only last week I heard some young qualifying students bemoaning the fact that they had to waste their time learning pharmacology. They could understand the necessity of learning to write prescriptions but they seemed to think that to know the verifiable action of drugs was superfluous. All this shows that the present medical course is giving rise to a large amount of mental indigestion. I am no Victorian grandfather but I doubt if the modern medical student is as well prepared for medical practice as we were in the leisurely, care-free pre-war days, and he has lost much of the old *joie de vivre*. A modern divine has said that "if you want a man to think deeply and earnestly, and with the fear of God upon him, set him thinking of education." If I had remembered this warning in time I should never have started writing about medical education. Nebridius, the friend of St. Augustine, was right in hating exceedingly a brief answer on a great question, "specially such as related to doctrines of faith."

One thing seems certain—if we taught and examined less, our students would learn more. If we add anything further to the medical curriculum let it be spare time.

PUBLIC HEALTH

SCHOOL MEDICAL TREATMENT

THE main aim of the school medical service has always been to prevent disease, but increasing provision has had to be made nevertheless for ensuring that treatment was available to those children who needed it. Local education authorities are obliged to provide for the treatment of defects of the eyes and teeth, minor ailments, and chronic tonsillitis and adenoids, and many of them have found it advisable to include also the treatment of ear, nose, and throat defects generally, orthopædic conditions, chronic and subacute rheumatism, speech defects, ringworm, and behaviour disorders, and to provide for artificial light treatment. Wherever possible use has been made of existing facilities outside the school service; in 1936 310 local authorities had arrangements with hospitals for providing treatment, and a large number of children are referred to their own doctors for advice.[1] The extension of the medical activities of municipal authorities as a result of the Local Government Act, 1929, offers an opportunity for the public health and school medical departments to pool their resources with benefit to both. The former can treat children with ear, nose, and throat defects and the like at their municipal hospitals, and the latter can arrange to deal with children under school age at their school clinics. The great majority of treatment schemes are, however, the result of arrangements with voluntary hospitals, aided both financially and otherwise by the widespread hospital contributory schemes. The free interchange of information about individual children between hospital and school medical officers is of great value, and its full possibilities may not yet have been fully realised.

The last year has seen a considerable increase in the number of permanent school clinics. Besides dealing with minor ailments—septic sores, impetigo, and other skin diseases—and carrying out dental, orthopædic, and artificial light treatment and refraction work, these clinics are being used increasingly as places where parents may obtain more general advice, the medical officer referring a child who needs treatment to the family doctor. There is an increasing tendency for the provision of joint health centres such as the new one at Bristol to include children under school age. Greater attention is being paid to dealing with ear, nose, and throat defects other than tonsils and adenoids, and it is being realised that the treatment of all such defects should be under the control of one specialist. A number of authorities now make provision for the orthoptic treatment of squint, usually through a voluntary hospital, though a few of the larger ones have installed the necessary apparatus in their own clinics. The greatest opportunity for coöperation between public authorities and voluntary organisations lies in the provision of orthopædic treatment. A voluntary organisation usually provides the orthopædic hospital and its satellite clinics, and the local authority may supply the actual premises for the clinics and finance in the form of fees for the treatment of their cases. At least one local education authority has appointed a whole-time teacher to conduct corrective classes in schools, and there is likely to be increased coöperation between those responsible for physical training and the orthopædic service. The treatment of children with acute rheumatism has always been regarded as the responsibility of the public health authority, but there is need for general practitioners, voluntary hospitals, and the education authorities to work together if children are to be satisfactorily provided for and educated at all stages of the disease. In 1936 111 local education authorities provided artificial light treatment, an increase of 6 over 1935, and 35 school clinics undertook the treatment of ringworm of the scalp. It is usually found more convenient for ringworm to be dealt with by voluntary hospitals or private practitioners, as the apparatus is expensive and the number of cases is generally small.

The arrangements made by local education authorities for a psychological service for the children under their care have extended considerably in the last year. At Birmingham, Bristol, Cardiff, and certain other large towns there are fully staffed child guidance clinics maintained by the authority. At Leicester a psychological service is maintained by the authority and staffed by a non-medical psychologist and social workers, whereas in Derbyshire and at Reading and Bath child guidance work is carried out by the education authority's staff as part of their general duties. Elsewhere authorities contribute to clinics established by voluntary hospitals or other

[1] See the Annual Report of the Chief Medical Officer of the Board of Education for 1936 reviewed in our last issue (p. 41).

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organisations. Such schemes are not possible everywhere, and at present it is difficult in the northern and eastern counties to obtain skilled advice on children who present problems of behaviour or of disordered personality, or whose difficulties with school work are not due to dullness or mental deficiency.

It is satisfactory that the union between the school medical service and the maternity and child welfare service is gradually becoming closer, though it is still the child between one and five years who receives least medical supervision, and at the other end of school life the new Factory Act makes provision for the passing on of information from the school medical officer to the factory surgeon.

A New Food and Drugs Code

The law of food and drugs has now been tackled by the experts who drew up the official codes that were passed into law as the Local Government Act, 1933, and the Public Health Act, 1936. It will be recalled that the Minister of Health appointed in 1930 a "local government and public health consolidation committee" to rewrite the laws and to consider under what heads the existing enactments should be grouped and what amendments were desirable to secure simplicity, uniformity, and conciseness. The legal advisers of the Ministry of Health may be complimented on having set up an excellent tradition in clarifying the law. The process is now carried to another stage. The great Public Health Act of 1936 did not deal with the whole of public health law. It covered the prevention and treatment of disease and such matters as drains, sewers, buildings, water-supply, noise nuisance, hospitals, and maternity centres. It did not cover food and drugs, milk and dairies, artificial cream, bread and flour, margarine, ice-cream, horseflesh and shell-fish, markets, slaughter-houses, and cold-air stores. These topics are now dealt with in the admirable Draft Bill (Cmd. 5629: 1*s.* 6*d.*). It is accompanied by the committee's Third Interim Report (Cmd. 5628: 1*s.*) which explains the contemplated grouping and amendment. To round off the rewriting of local government there remain various odds and ends of highway law still based on statutes of Henry VIII (as to bridges), William and Mary, and the century-old Highway Act of William IV. The Ministry of Transport is promoting a consolidation Bill for this purpose. When it is completed and passed a fine piece of work will have been done for facilitating local administration—a function, after all, largely in the hands of laymen and amateurs.

Our legislation on food and drugs has pursued two very different aims. The earlier Acts are mainly directed to protecting the purchaser from fraud; these were largely consolidated in 1928. The later provisions aim at safeguarding health. Some of the modern law is to be found in the common-form clauses which appear in Local Acts; some of it is in Public Health Act regulations. It is obviously proper to bring all these into one uniform code. Thus, to take a minor example, Clause 38 of the new Draft Bill prohibits the inflation of meat carcasses. One of the Public Health (Meat) Regulations of 1924 forbade the inflation of a carcass "with the breath or in any other manner likely to cause infection or contamination." A standard clause in many Local Acts enacts this prohibition but without the qualifying words above quoted; the object of the extension is to prevent fraud on the purchaser. The new draft clause reproduces the standard clause but restricts it to carcasses intended *for sale* for human consumption. One of the changes in the new Bill is the substitution of this expression "for human consumption" in lieu of various phrases such as "intended for the food of man." The Milk Acts contained several references to milk intended for sale "for use *in the manufacture of products* for human consumption." It is surely an illegal selling of unsound food whether or not it is intended that after sale the food is to be manufactured into some other product before being consumed. One important feature of the new code is that (except in the part relating to markets, slaughter-houses, and cold-air stores) the Bill is to apply to London. On general grounds of administrative convenience it was a pity that there should have been two separate public health codes in 1936, one for England except London and the other for London, when so much of the law was common to both.

A "Flying Squad" in London

Islington is shortly to have the first maternity emergency unit to be established in London. The unit will be worked through University College Hospital, to which the borough council of Islington will make a grant of £25 towards the initial cost of equipment, and will pay a fee of seven guineas whenever the unit is called out. The staff will consist of an obstetrician of consultant standing with three deputies, a medical officer to assist him, and a qualified nurse, and these will be immediately available to any doctor attending a confinement within the borough. Midwives will be expected where possible first to obtain the assistance of a doctor, but may call the unit direct in cases of extreme urgency. These emergency units, it may be recalled, were first advocated by Prof. E. Farquhar Murray in 1929, and one was established in Lanark in 1933; but it was not until 1935 that such a unit was initiated in England at Newcastle-on-Tyne. Since then other local authorities, in Northumberland and Durham, Birmingham and elsewhere, have adopted the scheme, which has been officially blessed by the Ministry of Health. The units are intended to meet the needs of parturient women who from shock, hæmorrhage, or other causes are too ill to be moved to a maternity hospital. The nurse reaches the patient's home in an ambulance, which stands by in case it is decided possible to send the patient to hospital. The medical staff are summoned and travel separately. In practice the calls made on a unit of this kind are not numerous—at Newcastle they amounted to 20 in eighteen months—but they have unquestionably saved lives, and the knowledge that expert help is available must materially lighten the anxieties of maternity work in industrial areas.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED DEC. 25TH, 1937

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2244; diphtheria, 1291; enteric fever, 19 (22 "expected"); pneumonia (primary or influenzal), 1093; puerperal pyrexia, 123; cerebro-spinal fever, 27; acute poliomyelitis, 5; encephalitis lethargica, 6; dysentery, 270; ophthalmia neonatorum, 67. No case of cholera, plague, or typhus fever was notified during the week.

There are 141 fewer notifications of dysentery than in the previous week, but it should not be forgotten that the week's

(*Continued at foot of following page*)

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CROYDON TYPHOID INQUIRY

DR. HOLDEN CROSS-EXAMINED BY COUNSEL FOR THE SOUTH CROYDON TYPHOID OUTBREAK COMMITTEE

(*Continued from p. 57*)

IN the course of his cross-examination of Dr. Holden on Dec. 28th Mr. Lycns quoted a letter from Lord Dawson and Sir Kaye Le Fleming in the *Times* of Dec. 2nd.

Mr. Lyons: It begins in this way: "Sir, In the letter published in your issue of Nov. 22nd, we refrained advisedly from any judgment on the cause and extension of the Croydon epidemic. On the other hand, we did suggest that, with the existence of the epidemic established 'it would have been profitable' for the M.O.H. to have sought the confidence and counsel of the medical profession in Croydon by means of chosen representatives. In not so doing the M.O.H. was following methods of administration common throughout the country, but unsuited to present-day needs, and out of accord with the public interest. . . . The following are our suggestions, which no doubt could be improved by constructive criticism." I will only deal with the heads of each paragraph: "(1) An Advisory Hospitals Board, consisting of representatives, lay and medical, of (*a*) municipal hospital and (*b*) voluntary hospital authorities in each local area. . . . (2) To bring the two groups of doctors together there should be the habit of responsible conference between them. . . . (3) The officers of the health services (excepting the M.O.H.) should, where possible, be appointed from among medical practitioners in their area. . . . Such a scheme would bring preventive and curative medicine into close coördination. . . ."

In reply to Mr. Lyons Dr. Holden agreed that there are many ways in which coöperation in an emergency can take place if the machinery is already in existence. He had never ignored the services that medical men in the borough could give him, and in this outbreak he had followed the usual practice of medical officers of health. Later, in cross-examination by Mr. Forbes, Dr. Holden stated that a standing committee of local medical practitioners would be of great assistance to the M.O.H., and, if such had been in existence in Croydon, he would gladly have coöperated with it and provided it with any information in his possession.

(*Continued from previous page*)

returns are likely to be incomplete. A large proportion of the cases were again reported from the home counties—e.g., London 72, Kent 25, Essex 19, Surrey 11; other counties with considerable numbers being Norfolk 32 (29 in Norwich), Devon 28 (scattered R.D.'s), Stafford 20 (various U.D.'s and R.D.'s).

The number of cases in the Infectious Hospitals of the London County Council on Dec. 31st was 4246, which included: Scarlet fever, 831; diphtheria, 1549 (diphtheria carriers, 41); measles, 445; whooping-cough, 349; puerperal fever, 10 mothers (plus 7 babies); encephalitis lethargica, 283; poliomyelitis, 3. At St. Margaret's Hospital there were 8 babies (plus 21 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox, 4 (1) from enteric fever, 31 (1) from measles, 7 (1) from scarlet fever, 18 (6) from whooping-cough, 37 (1) from diphtheria, 49 (12) from diarrhœa and enteritis under two years, and 46 (4) from influenza. The figures in parentheses are those for London itself.

Three deaths from typhoid were reported from Croydon. Liverpool had 13 deaths from measles, Manchester 7, Sheffield 2. Liverpool also reported 4 deaths from scarlet fever; Birkenhead 3 from whooping-cough. Diphtheria was fatal in 26 great towns, Liverpool reporting 5 deaths, no other great town more than 2.

The number of stillbirths notified during the week was 268 (corresponding to a rate of 51 per 1000 total births), including 37 in London.

DR. HOLDEN CROSS-EXAMINED BY COUNSEL FOR THE CROYDON DIVISION OF THE B.M.A. AND THE CROYDON LOCAL MEDICAL AND PANEL COMMITTEE

In further cross-examination of Dr. Holden on Dec. 29th, Mr. Forbes drew his attention to a resolution passed at the general meeting of the Croydon division of the B.M.A. on Nov. 9th, which read:

"Regarding the recent outbreak of typhoid fever in the borough, this meeting deplores the fact that the first intimation of the outbreak to medical practitioners was through the medium of the daily press."

Dr. Holden did not agree that this was a fair complaint so far as the 140 doctors were concerned to whom he had sent notices on Nov. 4th. In reply to a question whether he ought not to have got into conference with local practitioners as soon as he thought a serious outbreak would occur, Dr. Holden replied that he had already notified them of the occurrence of typhoid, and, as soon as he found that he was not getting along as fast as he would have liked, he had appealed to the authority whom he thought would give him the quickest and best help. Even now, looking back, he did not see how the local doctors could have helped him, and even when the water was definitely suspected he could not see that it would have helped to have told them. He had had no instructions from the public health committee to keep secret any suspicions that he might have had about the water. The policy of the committee was not to make matters public, but there was no specific reference to any particular matter.

(At this point the evidence of Dr. A. W. A. Davies of Croydon was interposed. He stated that he had attended a Mrs. Wilson of Pampisford-road, Croydon, on Oct. 13th, 1937, and, together with Dr. A. C. Hampson, had decided that she was suffering from typhoid fever contracted through eating oysters at Cannes some 10 to 14 days previously.)

Dr. Holden having been recalled, Mr. Murphy asked Mr. Forbes to bear in mind the distinction between collaboration between the M.O.H. and the local medical profession in the absence of an outbreak, and collaboration after an outbreak has taken place.

DR. HOLDEN CROSS-EXAMINED BY COUNSEL FOR THE STAFF OF THE CORPORATION

Mr. Dingle Foot, who is appearing for certain members of the staff of the Croydon public health department and borough engineer's department, asked Dr. Holden to look at the results of the analyses taken from the four wells on July 14th, 1937.

Mr. Dingle Foot: Had you the analysis of the sample taken from Addington on that date?—Yes.

Mr. Dingle Foot: And you see the remarks at the bottom: ". . . The filter is not effective and may be acting as a breeding ground for organisms. I recommend sterilisation . . ." ?—Yes.

Mr. Dingle Foot: Then if you turn to the next one, which is Surrey-street, you notice at the bottom Mr. Dibdin says: "I recommend chlorination."—Yes.

Mr. Dingle Foot: Then on Stroud Green he says: ". . . Chlorination is not essential but of course desirable" ?—Yes.

Dr. Holden agreed that he had received these analyses and that they had been discussed at a meeting on July 20th at which the borough engineer and Mr. Jones, the chief water assistant, were present. He did not remember Mr. Jones saying that Mr. Byles of the Metropolitan Water Board had recommended that chlorination should be at the rate of 0·15 part per million; the usual figure that he had in mind

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as a measure of precaution in an ordinary water-supply was 0·05 part per million.

DR. HOLDEN RE-EXAMINED BY HIS OWN COUNSEL

In reply to Mr. Sandlands, Dr. Holden agreed that the statement he had issued on Nov. 9th had been drawn up in a hurry and might have been clearer in certain parts. Mr. Sandlands quoted a passage which stated that the report of the Ministry of Health showed contamination from the gathering ground of the Addington well; he thought that Mr. Lyons did not appreciate the distinction between contamination and infection, but imagined that when a case was notified you could run round and find the *B. typhosus* in the tap of the patient's house. Dr. Holden said that the life of a typhoid bacillus in water depended upon the water and its temperature and might be from a few days to three to four weeks. The incubation period might be as long as 40 days, but was usually from 5 to 23 days, and before notification there was a further period of about 10 days before the patient was diagnosable as typhoid. The life of the bacillus was therefore pretty well exhausted before a sample of water from the patient's house could be examined. The organism had vanished before you knew that an epidemic had begun. On Nov. 4th he had received the report on the sample of water taken from the Addington main on Oct. 29th, showing the presence of *B. coli* in 10 c.cm., and if he had looked on Oct. 28th, 29th, and 30th in the houses where the first few cases were reported he would not have expected to find anything different from what the analysis showed.

Referring to the condition of the water from the Addington well before this outbreak, Mr. Sandlands read a report from the analyst dated Nov. 4th, 1936, which said: "This well water needs treatment before distribution. Contaminated rain-water is finding access." There were still signs of contamination in a sample dated Nov. 20th, 1936, but from then until Sept. 26th, 1937, there was nothing in the analyses to make Dr. Holden suspect that any contamination was getting into the water from the gathering ground. In October, 1937, therefore, there was no particular reason for suspecting the water-supply, and Dr. Holden had to inquire into other possible causes. Dr. Holden stated that he attended a meeting of residents in St. Augustine's-avenue on Oct. 31st, at which three main suggestions for inquiry were put forward: first, the repairs in the mains in the neighbourhood of St. Augustine's-avenue; then a cesspool at a cottage in Halinggrove; and finally flies and such things. After this meeting Dr. Holden had had samples taken from the cesspool, with negative results; he had followed up the matter of the repairs to the mains with the borough engineer and satisfied himself that they had nothing to do with the outbreak; and, although he did not attach much importance to the fly theory, he had followed that up too. He had had analyses made of the storage tanks in the houses in which cases had occurred, and the only one found to be contaminated was that at Russell School, Ballards, where colon bacilli were found.

With reference to camping grounds within the borough, Dr. Holden said that there had been no occasion for complaint. During this year there had been about 4000 boy scouts on and off in these camps; these boys had to carry out the regulations laid down in scout law, which in his opinion was satisfactory. In addition to these there was a colony of some sort, he thought a nudist colony, in the middle of a wood, but he had not been able to satisfy himself that any nuisance was being caused by it. He had had blood-tests taken from the members of a gipsy encampment to see whether any of them were carriers and no carrier had been found.

In reply to a question by Mr. Sandlands about Fisher's farm, which is on the gathering ground of the Addington well, Dr. Holden stated that no danger of typhoid was to be expected from farmyard manure unless there is an admixture of privy refuse, and that he had had the privy at this farm tested for typhoid bacilli with a negative result. He thought it possible that, especially after heavy rain, there might be a certain amount of contamination of the well from this farm. The gathering ground also contained a pig farm with 12,000 pigs, but Dr. Holden had not heard of any instance of pigs carrying typhoid. Bore-holes dug in that area had shown that soakage only went down about 12 feet and there was at least a further 8 feet of soil before chalk was reached, which should be sufficient to eliminate contamination unless actual fissures were present.

In January, 1937, there had been a fatal accident at the Addington well, and Dr. Holden had learned that thereafter the water was pumped to waste and chlorination was applied before it was again put into supply. As the result of inquiries Dr. Holden had found that the men who worked in the well were specially clothed, had done no sewer work for a considerable time beforehand, and were given instructions not to excrete or urinate in the well. While work was in progress the water was pumped to waste and it was chlorinated before being put into supply again. He could not have suggested any further precautions. Before this outbreak he had not heard of a Widal test being done on all workmen working in a well, but he had heard of it since.

Dr. Holden agreed with what was said by the chief medical officer of the Ministry of Health in his report for 1936 that water undertakers who possess supplies from strata such as chalk, in areas which are becoming increasingly built over, have a grave responsibility to the consumers; that analyses of the water at infrequent intervals will not ensure that sudden unexpected pollution will be recognised early enough to prevent an outbreak of intestinal disease; and that in some areas it is almost certainly desirable to make daily examinations of the water. At Addington there were side by side two glass tubes of flowing water, one filtered and one unfiltered, in which any change in the character of the water could be observed immediately. There was a battery of pressure filters, a chlorination plant, and an ammoniator, so that effective treatment could be commenced immediately any necessity arose.

DR. HOLDEN RE-EXAMINED BY COUNSEL FOR THE CROYDON CORPORATION

Sir Walter Monckton read a long passage from Thresh's "Examination of Waters" (of which Dr. Suckling is now a joint author), dealing with the vitality of typhoid bacilli. According to this authority: "Survival is influenced by many factors such as the nature of the containing material and its bacterial or other biological content; the presence of agents or substances inhibitory or destructive to bacterial life, and of these sunshine and temperature are important. . . . It is usually accepted that under the conditions prevailing in this country, 99 per cent. of typhoid bacilli die in less than five days, and 99·9 per cent. in seven days. . . ."

In answer to a question of Sir Walter's Dr. Holden agreed that it was very important in such an

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investigation as this not merely to find as far back as possible the causes of infection, but also the carriers who distribute it around. In the present investigation he had had the assistance of Dr. Conybeare from the Ministry of Health, who had been associated with the late Dr. Vernon Shaw in investigating the Bournemouth outbreak.

Mr. Murphy: Dr. Holden . . . when you get an outbreak of typhoid fever—I am choosing my words carefully and am excluding paratyphoid—as distinct from isolated cases, and you are able to trace back the source of the infection, do you not always come, not necessarily at the first stage or the last stage, but at some stage, to water?—No, not in every instance.

Mr. Murphy: Can you give me an example of a typhoid outbreak . . . where you have not got somewhere to water?—I cannot think of any one at the moment.

Mr. Murphy: Do not think me frivolous, but, like boiling oil in a light opera that most of us are familiar with, water always comes into it somewhere, does it not?—Yes, I think probably in actual practice that is so, but it need not necessarily be so. You could get milk infected directly from a patient or a carrier. . . .

Mr. Murphy: What is passing through my mind is this: If you are faced with an outbreak, or even the possibility of an outbreak of typhoid, does not your mind leap to water?—I think of water, yes, and I did think of water.

In replying to further questions by Mr. Murphy, Dr. Holden said that as far as he knew there was no definite standard of purity of water, and that a person who sells you water which is full of *B. typhosus* is under no penal consequences at all. Mr. Murphy suggested that this was a matter upon which the two eminent Members of Parliament present might well collaborate. On this subject Mr. Lyons quoted a section from the Public Health Act, 1936, which reads:

"A local authority who supply water under this Act shall secure that the water in any waterworks belonging to them from which water is supplied for domestic purposes is wholesome."

He also quoted a lecture by Colonel Harold, director of water examination for the Metropolitan Water Board:

"In this country . . . we have standards of housing, food and drug acts, milk regulations, infectious disease enactments, factory acts, highway codes, &c., but, strange to relate, no standards of water-supply."

When the inquiry reopened on Dec. 30th, Dr. Holden reverted to the suggestion of Mr. Murphy that all modern typhoid epidemics had been connected with water in some way. He said that he had looked the matter up over night and had found that there have been quite a number of small outbreaks due to articles of food and with no direct connexion with a public water-supply at all, for instance, the outbreak at Coventry in 1933 which was due to pressed beef and a carrier, and those at Penzance in 1923 and at Camborne in 1923 due to milk. In neither of the last two had water been implicated. There was a larger outbreak at Luton in 1924 due to ice-cream and one in Manchester in 1913 due to mussels. Mr. Murphy pointed out that he had not suggested that a public water-supply was always implicated.

DR. HOLDEN EXAMINED BY THE ASSESSORS

In reply to Sir Humphry Rolleston, Dr. Holden said that a medical officer of health had two main duties to perform—one to his local authority and one in his position as a medical practitioner. He should be available to advise and be consulted by the members of the authority and at the same time he should put before the local medical profession the facilities provided by the authority and try to act as a link between them and the medical profession. The relationship between the M.O.H. and the Ministry of Health should be a close one, and he always looked upon the Ministry as his adviser in case of need, though not in any way as his master.

Dr. Holden read a statement by the superintendent of police at Croydon to the effect that on Dec. 6th, 1937, 1200 notices had been delivered by the police to unoccupied houses and shops, so that when they became reoccupied the new occupants would empty their cisterns. As far as he knew no case of enteric had occurred in occupants through getting possession of such houses.

Mr. Gourley read a paragraph from the statutory rules and orders of the Ministry of Health prescribing the duties of a medical officer of health: "A medical officer of health shall inform himself as far as practicable respecting all matters affecting or likely to affect the public health in a district and be prepared to advise the local authority on any such matter."

Mr. Gourley: Well, we have gathered in the course of the evidence that your advice in the matter of water-supply apparently has been limited to a discussion of the results of chemical and bacteriological examinations of the water?—Yes.

Mr. Gourley: But did you not conceive it to be part of your duty to inspect the gathering ground, not for your own peace of mind, as you put it, but as part of your duties?—I have from time to time inspected the gathering ground, more especially with regard to the Addington well.

Dr. Holden agreed that he had realised that in certain circumstances Fisher's farm might be a menace to the supply, but as there had never been any evidence that the farm was an actual menace he had not made any representations to have the drainage of the farm connected to the sewer in Fetherbed-lane. Dr. Holden said that he might have given greater weight to the question of water-supply if he had realised that the water at Addington was not being chlorinated and that rapid filters were being used without coagulant. He agreed that the glass tubes in which the water could be seen before and after filtration would certainly not have indicated any change in the routine treatment of the water, but only that the water was clearer after passing through the filter.

THE BOROUGH ENGINEER EXAMINED

Dr. Holden was followed in the witness-box on Dec. 30th and 31st by Mr. C. E. Boast, borough engineer, and Mr. H. F. Brandram-Jones, formerly chief water assistant at Croydon and now assistant water engineer at Brighton. Mr. Boast explained that his general object was not merely to make the high-level and low-level water-supplies more readily interchangeable than before, but also to arrange for greater use of the "award and agreement water" of the Metropolitan Water Board. He had in mind, further, the question of air-raid precautions. When he took over his duties from his predecessor, he received no special warning about the gathering ground. He stated that the Addington well, when the men were down and in contact with the water, was pumped to waste; when the men were not in contact with the water, it was pumped to supply without either filtration or chlorination. In June, 1936, the well water was not so good and the Addington well was chlorinated in July at 0·05 part per million. In January, 1937, when a workman died at the well, and again in May, 1937, when there was discoloration from clay from another well, a heavier dose was used. The chief water assistant was responsible for the

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actual work and spent much of his time at or down the well. With him was the mechanical superintendent, Mr. Ellis, and the mechanical foreman, Mr. Blackshaw. Mr. Boast said that he gave directions to the chief water assistant that the men working in the well should be very carefully chosen. He had in mind the risk of consumption from spitting. The question of a typhoid germ carrier never occurred to him. A report dealing with the Caterham outbreak in 1879 was put to Mr. Boast: it stated that a workman suffered from fever with much diarrhœa; some of his excreta accidentally became spilt from a bucket in the well, with the result that 352 people suffered, 21 fatally, from enteric fever. The witness said that he would have consulted the medical officer if he had thought there was the slightest danger. He had never heard, before the outbreak at Croydon, of men being tested for typhoid prior to descending to work in a well or adit. He had heard of one case, at Brighton, since the outbreak; he could not say if the workmen were examined by a blood test or merely by their history. At this point the chairman of the tribunal, Mr. Murphy, observed that, according to his instructions which came from a very high source, the only effective test for *B. typhosus* was bacteriological examination of the excreta and urine. Counsel suggested that this might mean six weeks or two months in hospital. Other answers by Mr. Boast indicated that no log was kept of the chlorination dates before the outbreak, that the Addington well was not chlorinated for a month before the outbreak, that he learnt (by ringing up Mr. Brandram-Jones at Brighton), after the meeting of local residents on Nov. 3rd–4th, that the water from the Addington well was not being chlorinated, that he himself had no specialised knowledge of chemistry (though he had taken chemistry in the London matriculation examination) but he had enough everyday knowledge to appreciate what a specialist might tell him, and that his previous appointments before coming to Croydon were at places which did not get their water-supply from the chalk. The chairman asked him if he had now formed any opinion as to the source of contamination in the well. He replied that he felt it must be from the gathering ground; the men were trustworthy and careful, but he admitted there was the possibility of an accident with the bucket. "Even now," said Mr. Boast, "my mind turns to the pollution from the gathering ground." "Even now," queried the chairman, "when you know that one of these men was a carrier? Have you it in your mind that the dates of that man who was a carrier being down the well fit in with the outbreak and course of this epidemic?" Mr. Boast agreed that the fact was very significant.

THE CHIEF WATER ASSISTANT EXAMINED

Mr. Brandram-Jones gave evidence of the course of the work in the well. The men were selected for physical fitness and steady nerves. Special clothing was issued. He and Mr. Ellis decided that it would be most unwise to allow the men to excrete when down the well, even with proper provision made for it. The urination of the men in the well was not discussed as they were aware that a bucket would be used. It was an ordinary type of bucket; it was kept at the top and sent down when asked for. The witness was pressed as to the possibility of the men excreting while in the well out of sight or in branch adits. He said there were no corners to which they could go: he would answer for any one of them.

On resumption of the inquiry on Jan. 3rd Mr. Brandram-Jones completed his evidence. He was asked by Mr. Gourley, the water engineer who is a member of the tribunal, whether it had not occurred to him to report, as chief assistant water engineer, to Mr. Boast, the borough engineer, upon the matter of chlorination or absence of chlorination from time to time. "Did it not occur to you to say, 'Look here, we are cutting off chlorination,' when you had in mind that it had proved so effective before?" The witness replied that, if he had thought of it, he would have mentioned it to Mr. Boast. Mr. F. S. Ellis, mechanical foreman in the water engineering department of the Croydon corporation, in the course of his evidence, said he had never seen any failure to comply with the sanitary precautions at the well. In answer to the chairman he said that the special clothing issued to a workman might be worn by another workman or a number of workmen at subsequent shifts. Mr. R. J. Jackson, chief sanitary inspector, mentioned, among other possible causes of the outbreak, the presence of 4000 boy scouts at a camping site near Croydon outside the borough boundary. The chairman indicated that it would need very strong persuasion to induce the tribunal that the *B. typhosus* found its way from this camp into the Addington well.

EVIDENCE OF WORKMEN, THE SANITARY INSPECTOR, AND THE CONSULTING ANALYST

At Tuesday's session evidence was given, anonymously, by workmen who had been employed in the well, and two of them said they had never known of any breaking of the rules made about defæcation and urination. Sir Walter Monckton requested that it should be placed on record that, according to his information, one of the workmen appearing as witnesses had suffered from typhoid during the war and had been treated in Addington Hospital.

Mr. Jackson, chief sanitary inspector, was asked by Mr. Geoffrey Howard whether Dr. Holden appeared active during the outbreak. "Did he appear to be unconcerned in the matter, or was he working very hard in investigating the cases?" Mr. Jackson replied, "I have known Dr. Holden for many years, and have never known him to be unconcerned about anything."

Dr. Suckling, consulting analyst, said that the presence of a carrier in the well was in his opinion the most likely cause of the outbreak, but the evidence was not at all conclusive. There were indications of pollution of the well by sewage. While work was going on the supply of water from the well should have been cut off if an alternative was available.

THE SERVICES

ROYAL AIR FORCE

Air Commodore Albert Victor John Richardson has been appointed director of Royal Air Force Medical Services in succession to Air Vice-Marshal Sir Alfred Iredell, who retires on March 1st. Air Commodore Richardson is at present principal medical officer at Headquarters, Bomber Command.

TRIBUTE TO SIR JOSEPH SKEVINGTON.—The main operating theatre at the King Edward VII Hospital, Windsor, is in future to be known as the Sir Joseph Skevington theatre. Sir Joseph has been appointed hon. radiologist to the hospital on his retirement from the position of senior surgeon, in charge of the radiology department. He has been a surgeon to the hospital since 1903.

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NEW YEAR HONOURS

THE honours list issued last Saturday contains the names of the following members of the medical profession :—

G.C.V.O.

Thomas Jeeves, Baron Horder, K.C.V.O., F.R.C.P.
Physician-in-ordinary to the King.

K.C.I.E.

Major-General Ernest A. Walker, C.B., F.R.C.S.E.
Lately director of medical services in India.

D.B.E.

Miss Florence Barrie Lambert, C.B.E., M.B., D.P.H.
Formerly chairman of the hospitals and medical services committee, London County Council.

Knights Bachelor

Robert James Johnstone, F.R.C.S., F.C.O.G.
Professor of gynæcology, Queen's University, Belfast.

Joseph William Leech, F.R.C.S.E.
M.P. for Newcastle-upon-Tyne West since 1931.

Charles Norman Paul, M.B.
Dermatologist to the Sydney Hospital.

William George Savage, M.D., D.P.H.
Late medical officer of health for Somerset.

Charles McMoran Wilson, M.C., F.R.C.P.
Dean of St. Mary's Hospital medical school.

C.B.

Major-General W. P. Macarthur, D.S.O., O.B.E., F.R.C.P., K.H.P.
Commandant, Royal Army Medical College.

C.M.G.

Theodore Grant Gray, M.B.
Director-general, mental hospitals, New Zealand.

Philip Henry Manson-Bahr, D.S.O., F.R.C.P.
Consulting physician to the Colonial Office.

John Newman Morris, F.R.A.C.S.
Surgeon to St. Vincent's Hospital, Melbourne.

Albert Rutherford Paterson, M.B., D.T.M. & H.
Director of medical services, Kenya.

C.I.E.

Lieut.-Colonel F. A. Barker, O.B.E., M.D., I.M.S.
Inspector-general of prisons, Punjab.

Lieut.-Colonel G. Tyler Burke, F.R.C.P., I.M.S. (retd.).
Lately secretary of the Medical Council of India.

Lieut.-Colonel R. V. Martin, M.R.C.S., D.O.M.S., I.M.S.
Officiating inspector-general of prisons, Bombay Presidency.

Colonel P. S. Mills, M.B., D.T.M. & H., I.M.S.
Surgeon-general with the Government of Bengal.

C.B.E.

Surgeon Rear-Admiral Bryan Pickering Pick, O.B.E., M.R.C.S., K.H.S

O.B.E. (Civil)

Edward Pohau Ellison, M.B.
Chief medical officer, Cook Islands, New Zealand.

John Charles Fulton, M.B.
Medical superintendent, Launceston Public Hospital, Tasmania.

Miss Janet Vera Good, M.R.C.S.
Senior woman medical officer, General Post Office.

Hugh Morley Oliff Lester, M.R.C.S., D.T.M. & H.
Deputy director, Sleeping Sickness Service, Nigeria.

Rev. Peter McGregor Shepherd, M.B.
Of U.F. Church of Scotland Mission, Bechuanaland.

M.B.E.

Miss Selina Fitz-herbert Fox, M.D.
Founder and director, Bermondsey Medical Mission.

John Maxwell Hall, M.R.C.S.
Senior sanitary medical officer, Jamaica.

William Stanislaus Martin, I.M.D.
Civil surgeon, Coonoor, Madras.

Miss Pauline Versfeld Murray, M.B.
For medical services in Nyasaland.

Rai Bahadur Pitamber Pant.
Civil surgeon, Etawah, United Provinces.

Kaisar-i-Hind Medal

Major John Michael Pereira, M.B.E., I.M.D. (retd.).
Superintendent of Patna Medical College Hospital.

Miss Sarah Jamieson Rankine, M.B.
Medical officer, St. Margaret's Hospital, Poona.

Mrs. Mary Hilda Youle Remfry, M.B.
Formerly of Calcutta.

Hari Vishwanath Tilak, F.R.C.S.E.
Medical practitioner, Bombay.

PANEL AND CONTRACT PRACTICE

OPHTHALMIC BENEFIT IN THE NEW YEAR

AN insurance practitioner is required, if so desired by the patient, to furnish him with a recommendation in writing that ophthalmic treatment should be obtained. If a patient needs such treatment the practitioner is advised to issue a simple certificate on the following lines: "I am of opinion that the above-named requires a further examination of his eyes." Any special feature of the case may then be stated.

As from the first day of January certain alterations in the regulations dealing with ophthalmic benefit come into force. A committee known as "the ophthalmic benefit approved committee" has been placed by the National Health Insurance Joint Committee in charge of the administration of ophthalmic benefit and of the general arrangements for the supply of glasses to insured persons. This committee, which consists of representatives of approved societies and of opticians, has been instructed to compile a list of opticians who may undertake insurance work, and the list, which will shortly be issued, will include the names not only of individual opticians but of firms which have undertaken to comply with the committee's requirements and to employ on this work only recognised opticians. Hitherto approved societies have had discretion to permit a member to obtain an optical appliance from any optician, but henceforward a member will not be entitled to receive a grant unless his glasses have been obtained from an optician whose name is on the list. Moreover no payment may now be made towards the cost of glasses if their cost exceeds that laid down in the committee's approved scale of charges. The scale includes prices for all types of appliances commonly in demand by insured persons; it also provides for special appliances (normally this means special lenses) and specifies the charges for replacements and repairs. Insurance practitioners should note the information which must now be given by societies in the ophthalmic letter issued to members who apply for ophthalmic benefit.

Three model letters have been drawn up by the committee, one of which is for use where the society

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has made arrangements with an organisation which provides both examination by a medical eye specialist and optical appliances, another is for use where the society's normal arrangements are for the service to be provided by opticians direct, and the third is for use where the society uses an optician's service but either the member himself wishes to have an examination by a medical eye specialist or the society is satisfied that such an examination is necessary. In those cases where the society has arranged for the service to be provided by an optician it is open to the insured person to have his eyes examined by a medical eye specialist, but he will be responsible for any extra cost so incurred. The society in such cases has to notify him of the grant which they will be prepared to make towards the cost of the examination by the specialist. Similarly where the society provides for an examination by a particular specialist if the member wishes to go to some other specialist he will be responsible for any additional cost.

Insurance practitioners who have been recognised as medical eye specialists should remember that if they examine the eyes of their own insured patients they are required to submit Form G.P.45 to the appropriate insurance committee. This is not necessary, of course, in connexion with the examination of the eyes of the insured patients of other practitioners.

OBITUARY

EDWARD MAGENNIS, M.D.R.U.I.

WE have to record the death on Sunday last of Dr. Edward Magennis at his home in Dublin, after a short illness, in his eighty-second year. He came from County Armagh, and after attending Queen's College, Belfast, qualified in 1880 with the licences of the Royal Colleges of Edinburgh. Four years later he took his M.D. degree, and in 1891 the D.P.H. After some 18 years in general practice at Lurgan in his native county he decided to devote himself to ophthalmology, and spent some time in studying the subject in London at Moorfields. He then set up in Dublin as a specialist in diseases of the eye, and was soon taking an active part in the medical and social life of the city, especially in the affairs of the Apothecaries' Hall and of the Irish Medical Association. He was for a term governor of the former, and for two years he was president of the latter. He represented the Apothecaries' Hall on the General Medical Council from 1914 onwards, and he was a member of the Irish Free State Medical Registration Council from its establishment in 1927. Among his other duties were those of magistrate for Counties Down and Armagh. A sociable, courteous, and courtly man, Dr. Magennis was held in affection by his medical colleagues. His two sons are members of our profession and are in practice in Dublin.

DAVID MORGAN, M.B. Edin.

Dr. Morgan, formerly medical superintendent of the Cunard Company, died in London on Dec. 26th. He was 75 years of age and his death came at the end of a long illness. His father was David Morgan of Bala, his grandfather Evan Morgan of Plasynd, Rhayader; and it was to Rhayader that the young doctor returned as general practitioner when his undergraduate education at University College and Edinburgh University ended in 1884. After a time in practice, however, he decided to visit the Far East, and went to China as ship's surgeon. On his return to England he settled in Liverpool where he collaborated with Hugh Owen Thomas and Robert Jones in their orthopædic work. Morgan was one of the pioneers of radiology in this country, and as hon. radiographer at the Southern Hospital gave valuable service. Unfortunately he was also one of the many that paid heavily for the knowledge gained, and the damage by X rays to his hands obliged him to find other employment. It was then that he took the post of medical superintendent of the Cunard Company, and in this capacity, by securing better equipment and more efficient personnel, he did a great deal to secure more adequate medical service at sea. During the late war he superintended the fitting-out of the *Mauretania* as a hospital ship, and sailed in her to the Dardanelles.

At the funeral service last week the only wreath was of blue and white flowers in the form of the blue peter, the flag a vessel flies on leaving port.

ARTHUR PATRICK BARRY, M.B.R.U.I., M.C.O.G.

Dr. Barry's death was not unexpected, for he had been ill for some months; but the news was received with deep regret in Dublin. He qualified in 1904, having gone to the Catholic University school of medicine in Dublin from his birthplace, Kanturk in Cork. Soon after graduation he was appointed assistant master of the National Maternity Hospital, Dublin, and on expiry of his term of office he began to practise as an obstetrician and gynæcologist. In this work he was very successful and inspired confidence in patients and colleagues alike, coming to enjoy one of the largest practices in his specialty in Dublin. Despite heavy and constant professional work he also made time for other interests. In his younger days he was a good association football player, and for many years he was one of the best lawn tennis players in the country. For several years past, although his active play had stopped, he was captain of the Irish international lawn tennis team. Not only was Barry respected as a consultant and associate, but, as a colleague puts it, "no more kindly or trusty friend could be found." To the poor he was generous of his activity without measure.

He died on Jan. 2nd. Of his four sons, his namesake is a member of the medical profession.

Major-General THOMAS MAUNSELL, who died at Uxbridge on Dec. 29th, had reached his ninety-ninth year. The son of John Maunsell, he was born in Dublin on July 1st, 1839, qualified L.R.C.S.I. in 1859, and entered the army in the following year. Thirty-nine years later when he retired he had reached the rank of surgeon-general. Early in this long period he had accompanied the Burma expedition and the Chitral relief force, and his service ended with four years as principal medical officer at Malta. He was created C.B. in 1896.

CONGRESS ON THE HISTORY OF MEDICINE.—The eleventh International Congress on the History of Medicine will take place in Jugoslavia from Sept. 3rd to 11th under the presidency of Prof. Lujo Thaller. Visits will be paid to Zagreb, Belgrade, Sarajevo, and Dubrovnik, and sessions will be held at each of these places. Further information may be had from the secretary of the congress, Dr. Vladimir Bazala, Vlaska ulica 95, Zagreb.

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CORRESPONDENCE

OVER-ACTIVITY OF THE POSTERIOR PITUITARY

To the Editor of THE LANCET

SIR,—I should like, if I may, to call the attention of Dr. E. Idris Jones to the work carried out by Libman and myself on the influence of posterior pituitary extracts on carbohydrate metabolism, for our experimental observations in man appear to corroborate his findings in the case he reported in your last issue as "a new syndrome due to over-activity of the posterior pituitary."

In discussing carbohydrate metabolism and the pituitary gland he writes, "The relation of the posterior lobe extract (Pituitrin) to carbohydrate metabolism is . . . somewhat disputed." Libman and I (*Quart. J. Med.* 1936, n.s. **5**, 169) showed that subcutaneous injections of posterior pituitary extracts, even if repeated at half-hourly intervals for two or three doses, were without any appreciable effect on the blood-sugar; but if 50 g. of glucose be given *and* at the same time, or shortly afterwards, 0·5–1·0 c.cm. of pituitrin is injected subcutaneously, instead of the normal glucose-tolerance curve resulting a sustained hyperglycæmia follows. We showed later (*Ibid*, 1937, n.s. **6**, 157) that posterior pituitary extracts antagonised the action of insulin by retarding the peripheral utilisation of the blood-sugar.

Dr. Idris Jones's patient showed but a very slightly raised fasting blood-sugar. After taking 50 g. of glucose he had a sustained hyperglycæmia. If the subcutaneous injection of 0·5–1·0 c.cm. of pituitrin in the *fasting* state were followed by no constant or appreciable rise in the blood-sugar, he would conform fully to our experimental findings in man and additional confirmation would be afforded of Dr. Idris Jones's suggestion that the clinical findings in his patient are the expression of over-activity of the posterior pituitary.

I am, Sir, yours faithfully,

Liverpool, Jan. 1st. HENRY COHEN.

TREATMENT OF THE COMMON COLD

To the Editor of THE LANCET

SIR,—Referring to your leading article in last week's issue, it seems likely that the common cold is due primarily to a virus with secondary catarrhal infection. A personal experience some years ago lends colour to this view. A cold was running through the house of a family of five persons and I took post-nasal cultures with a guarded West swab. Each member of the family had a different microbe. It would be easy to explain this otherwise surprising result on the virus hypothesis. As quinine is said to be of value in aborting virus disease, I have recently taken five grains whenever I have felt the early tickle of a cold and, if it has not gone in an hour, another five grains. So far this has been successful.

In addition to the quinine, I have as a rule used a nasal preparation containing a vegetable oil as the excipient instead of liquid paraffin. This brings me to another point: the use of a mineral oil for local treatment of the nose. I believe the constant instillation of liquid paraffin to be dangerous, as it is so easy to allow some of this bland and soothing mixture to trickle down the pharynx and enter the trachea, and this not only in infants, on which as a cause of pneumonia you have lately commented (*Lancet*, 1937, **1**, 1239), but also in adults. It is not perhaps realised that a mineral oil is not absorbed and therefore remains in the lung. I am credibly informed that in a recent post-mortem 150 c.cm. of liquid paraffin was discovered in the lungs as the result of two years' use of a nasal oil.

I am, Sir, yours faithfully,

Harley-street, W., Jan. 3rd. H. WARREN CROWE.

ELECTRICAL INTERFERENCE IN ELECTRO-CARDIOGRAPHY

To the Editor of THE LANCET

SIR,—I have been advised by the Cambridge Instrument Co. that the use of the instrument to patient earthing lead, that I suggested in your issue of Nov. 27th last, is not without risk when using the Standard instrument as it is constructed at present. There is a possibility of inadvertently switching the patient on to the main supply.

This risk does not apply to the Portable model with which it may be used with impunity. In my letter I referred only to the Portable model, but I think it is desirable to ask you to issue this warning for the benefit of those who use the Standard model.

I am, Sir, yours faithfully,

Torquay, Jan. 1st. PAUL C. GIBSON.

"DIET AND HIGH BLOOD PRESSURE"

To the Editor of THE LANCET

SIR,—Kindly allow me to comment on the review of this book in THE LANCET of Dec. 25th. This volume was written for the non-medical reader. It is however based on an inquiry in which strictly scientific methods unusual in clinical medicine were used, the result of which has been published by the Oxford University Press under the title "High Blood Pressure." (The hypothesis at the end of the book must not be confused with the conclusions drawn from the purely experimental work.) We all know it is difficult to upset current beliefs, however slender the evidence on which they are based. This is particularly regrettable in this instance, because the volume contains an account of a method of treatment of hypertony which is the only one I know which materially prolongs the lives of sufferers from this malady.

I would suggest that my colleagues, instead of expressing doubt for no particular reason, repeat my experiments and observe clinically cases under strict scientific control, as I am doing. Those of your readers who have studied the facts as elucidated by the volume mentioned above without bias will easily convince themselves that the conclusions are based on overwhelming evidence.

I am, Sir, yours faithfully,

Liverpool, Dec. 25th, 1937. I. HARRIS.

ROYAL SANITARY INSTITUTE.—The institute has arranged for a discussion on the national campaign for physical fitness to take place in the town hall, Darlington, on Friday, Jan. 21st, at 4.45 P.M. The discussion will be opened by Dr. G. A. Dawson, medical officer of health for Darlington. Dr. W. E. Orchard will describe the place of social hygiene, Dr. Isabel Brown the school medical services, and Dr. W. W. Forsyth the rôle of the general practitioner. On Saturday morning the members present will see a colour film of Darlington's health services, after which they will visit the health centre, the fever hospital, and an elementary school.

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MEDICAL NEWS

University of London

At recent examinations the following candidates were successful :—

M.S.

Branch I (surgery).—G. S. Ferraby, King's Coll. Hosp.; K. L. James, Univ. Coll. Hosp. and Charing Cross Hosp.; and C. J. B. Murray, Middlesex Hosp.

Branch IV (laryngology, otology, and rhinology).—Maxwell Ellis, Univ. Coll. Hosp.

University of Leeds

Dr. Charles Ludwig has been appointed to a demonstratorship in physiology.

Royal College of Surgeons of England

On Jan. 17th Mr. J. Cole Marshall will give the first of a series of Hunterian lectures which will be held at the College at 5 P.M. on Mondays, Wednesdays, and Fridays till Feb. 16th. He will speak on the surgical treatment of detachment of the retina. The other lectures are as follows : Jan. 19th, Mr. R. T. Payne, cancer of the stomach as a surgical problem ; 21st, Mr. R. C. Brock, the pathology, diagnosis, and treatment of intrapulmonary new growths ; 24th, Mr. W. E. Underwood, recent observations on the pathology of hydronephrosis ; 26th, Mr. J. I. Munro Black, the lympho-epitheliomata ; 28th, Mr. Maxwell Ellis, the function of the bronchial tubes ; 31st, Mr. T. W. Mimpriss, the treatment of retention of the testis ; Feb. 2nd, Mr. Harold Rodgers, the endoscopic appearances of normal gastric mucosa and its variations in disease ; 4th, Mr. T. F. Todd, rectal ulceration following irradiation treatment of carcinoma of the cervix (pseudo-carcinoma of the rectum) ; 7th, Mr. H. J. B. Atkins, chronic mastitis ; 9th, Mr. T. Stewart Heslop, an experimental study of the neurogenic origin of peptic ulceration ; 11th, Mr. P. B. Ascroft, an experimental study of the surgical treatment of arterial hypertension ; 14th, Sir Arthur Keith, the prehistoric people of Mount Carmel ; and 16th, Dr. W. E. Gye, some recent work in experimental cancer research.

Order of St. John of Jerusalem

The following promotions in and appointments to the Venerable Order of the Hospital of St. John of Jerusalem have been sanctioned by the King :—

As Commander.—Major-General E. W. C. Bradfield, C.I.E., O.B.E., M.S.; and Major-General Sir Frank Connor, F.R.C.S., K.H.S.

As Associate Commander.—D. H. Mehta, L.M. & S.; and Lieut.-Colonel K. K. Chatterji, F.R.C.S.I.

As Officer.—Major N. F. C. Burgess, M.D.; S. A. Wilkinson, M.R.C.S.; Lieut.-Colonel John Rodger, O.B.E., M.B.; Colonel N. M. Wilson, O.B.E., M.R.C.S.; Major-General E. A. Walker, C.B.E., F.R.C.S. Edin., K.H.S.; E. E. Dufty, L.M.S.S.A.; H. J. Paterson, C.B.E., M.D.; C. D. Newman, M.B.; J. F. Fitzmaurice, L.R.C.P.; Colonel J. A. S. Phillips, C.I.E., L.R.C.P. Edin.; Prof. W. I. Gerrard, O.B.E., F.R.C.P.; the Hon. Richard FitzGerald, M.D.; and J. S. Webster, M.D.

Medical Society of London

The second half of the 1937–38 session of this society will open on Jan. 10th with a pathological meeting. On Jan. 24th Dr. J. C. White (Massachusetts), Sir Thomas Lewis, F.R.S., Prof. E. D. Telford, and Prof. J. R. Learmonth will open a discussion on recent advances in surgery of the sympathetic nervous system. Other discussions and their openers will be : Dr. J. H. Douglas Webster, Dr. W. M. Levitt, and Dr. G. E. Vilvandré on what can be expected of deep X ray therapy ; Prof. Henry Cohen and Mr. C. W. Bryan on the causes and treatment of flatulence ; Dr. T. Izod Bennett, Mr. A. Dickson Wright, and Dr. W. G. Oakley on uræmia ; and Dr. James Maxwell and Mr. R. C. Brock on diagnosis and treatment of lung abscess. The Lettsomian lectures will be held on Feb. 21st, March 2nd and 7th by Dr. George Graham, who is to give a survey of the changes and results of treatment of diabetes in the last fifteen years. Sir Henry Gauvain will deliver the annual oration on May 9th when he will speak on planning a hospital. The society may be addressed at 11, Chandos-street, W.1.

University of Calcutta

In connexion with the jubilee meetings of the Indian Science Congress Association the University is conferring honorary degrees on Prof. C. G. Jung, Dr. C. S. Myers, F.R.S., and Prof. U. Straub.

Radium

Treasury Order 1937, No. 11, continues the exemption of radium compounds from key industry duty till August 31st, 1938.

Medical Society of Individual Psychology

The annual dinner of this society will take place on Thursday, Jan. 13th, at 7.45 P.M., at the Florence Restaurant, Rupert-street, London, W. The principal guests will be Prof. John MacMurray and Dr. R. D. Gillespie.

Heberden Society

A quarterly meeting of this society will be held at 11, Chandos-street, London, W., at 8.30 P.M., on Thursday, Jan. 13th, when Dr. William Goldie, research fellow in rheumatism of the University of Leeds, will read a paper on *Streptococcus hæmolyticus* in the ætiology of rheumatic fever and rheumatoid arthritis. Dr. Mervyn Gordon, F.R.S., will also speak. The society, which was formed not long ago, is composed of clinicians who are or have been working at the British Red Cross Clinic, Peto-place, and its object is the study of the rheumatic diseases, mainly from their clinical aspect. A limited number of medical practitioners who have not worked at the clinic, but who are interested in the study of arthritis and allied conditions, may also be elected. Further particulars may be had from the hon. secretary, Dr. Kenneth Stone, 58, Chesterfield-house, London, W.1.

THE LANCET 100 YEARS AGO

January 6th, 1837, p. 522.

From a leading article.

IT may be safely assumed that the science of medicine would attain a much more sound and healthy condition than it now exhibits, were every veil and cloud of mystery removed from it, and the mass of the community accustomed to regard it simply as one of the inductive sciences . . . what we are desirous of seeing is an avoidance, on the part of all medical men, of that mysticism and secrecy in which medicine has hitherto been involved ; we should wish to witness the triumph of common sense in the rejection of all words and terms of foreign and barbarous origin ; we would admit the public, in part, at least, behind the scenes, and not by an affected employment of uncouth symbols, and unknown words, endeavour to give to the art of medicine a factitious degree of importance, and, as it were, sanctity, which every honest and true votary disclaims.

The progress of quackery, and the infatuated ignorance which prompts men to prefer the charlatan to the educated practitioner, have been the subject of long and loud complaint on the part of the profession. . . . It may be worth while to inquire how far the present progress of quackery may not have been promoted by the conduct of medical practitioners themselves. What is the essence of quackery ? Secrecy. Without it the quack could not exist ; mysticism and ignorance form the body and blood of quackery ; ignorance on the part of the recipient ; mysticism on the part of the distributor. If this view of the subject be true,—if, to use a professional phrase, we have discovered the morbid elements which constitute the disease, the discovery of a remedy and its application will not present obstacles of insurmountable difficulty. "Remove the cause and the effect ceases," is a well known medical adage. Remove ignorance from the people, and mysticism from the practice of medicine, and the quack's avocation will soon be gone.

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Medical Diary

January 10th to January 15th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY.
Therapeutics and Pharmacology. 5 P.M.
Dr. R. A. McCance: Analysis of Diets taken by Pregnant Women. Dr. Margaret Balfour: Effect of the Addition of Certain Concentrated Food Substances to the Diet of Pregnant Women in South Wales.
Psychiatry. 8.30 P.M.
Dr. L. C. Cook: Cardiazol Convulsion Therapy in Schizophrenia.
WEDNESDAY.
History of Medicine. 5 P.M.
Dr. J. R. Whitwell: General Paralysis: a Historical Survey.
THURSDAY.
Medicine. 8.30 P.M.
Dr. Francis M. Rackemann (Boston, U.S.A.): Certain Aspects of the Asthma Problem. Prof. L. J. Witts and Dr. E. R. Boland will also speak.
FRIDAY.
Ophthalmology. 8.30 P.M. (Cases at 8 P.M.)
Mr. R. Foster Moore and Mr. P. G. Doyne: The Determination of Disability Resulting from Industrial Diseases, excluding Miner's Nystagmus. Mr. R. Beatson Hird, Mr. Montague Hine, Mr. T. Harrison Butler, and Mr. T. Collyer Summers will also speak.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.
MONDAY.—8 P.M., Pathological Meeting.

LONDON JEWISH HOSPITAL MEDICAL SOCIETY, Stepney-green, E.
THURSDAY.—3.15 P.M., Dr. C. J. C. Britton, Dr. G. W. M. Findlay, and Dr. M. L. Rosenheim: The Present Status of Chemotherapy.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.
FRIDAY.—8.45 P.M. (Miller General Hospital, S.E.), clinical evening.

PADDINGTON MEDICAL SOCIETY.
TUESDAY.—9 P.M. (Tuberculosis Dispensary, 20, Talbot-road, W.), Dr. Temple Grey: The Difficulties of Death Certification. Dr. F. C. Martley, Dr. Percy Stocks, and Mr. E. A. J. Heath will also speak.

SOUTH-WEST LONDON MEDICAL SOCIETY.
WEDNESDAY.—9 P.M. (Bolingbroke Hospital, Wandsworth Common, S.W.), Mr. E. D. D. Davis: Some Practical Points in the Diagnosis and Treatment of Sinusitis.

SOCIETY FOR THE STUDY OF INEBRIETY.
TUESDAY.—4 P.M. (11, Chandos-street, W.), Dr. W. Norwood East and Major W. H. Coles: Some Official Contacts with Addiction.

HARVEIAN SOCIETY.
THURSDAY.—8.30 P.M. (26, Portland-place, W.), annual general meeting. Dr. A. H. Douthwaite: Doctors and the Public. (Presidential address.)

BIOCHEMICAL SOCIETY.
FRIDAY.—4.15 P.M. (Lister Institute, Chelsea Bridge-road, S.W.), Short Communications and a Demonstration.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
TUESDAY.—4.30 P.M., Prof. Arthur Ellis: Nephritis.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 3 P.M., clinical and pathological conference (surgical). 3.30 P.M., Mr. Leslie Williams: Disproportion and Difficult Labour. 4.30 P.M., Dr. Cuthbert Dukes: Tumours of the Colon.
THURSDAY.—2.15 P.M., Dr. Duncan White: Radiological Demonstration.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. C. Naunton Morgan: Diseases of the Rectum.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.6.
MONDAY.—10 A.M., Dr. Post: X Ray Film Demonstration, skin clinic. 11 A.M., surgical wards. 2 P.M., operations, surgical and gynæcological wards, medical, surgical, and gynæcological clinics.
TUESDAY.—10 A.M., medical wards. 11 A.M., surgical wards. 2 P.M., operations, medical, surgical, and throat clinics.
WEDNESDAY.—10 A.M., children's ward and clinic. 11 A.M., medical wards. 2 P.M., gynæcological operations, medical, surgical, and eye clinics.
THURSDAY.—10 A.M., neurological and gynæcological clinics. Noon, fracture clinic. 2 P.M., operations, medical, surgical, genito-urinary and eye clinics.
FRIDAY.—10 A.M., medical wards, skin clinic. Noon, lecture on treatment. 2 P.M., operations, medical, surgical, and throat clinics.
SATURDAY.—10 A.M., children's and surgical clinics. 11 A.M., medical wards.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY to SATURDAY.—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in dermatology (open to non-members).—NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W., all-day course in cardiology (open to non-members).

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
TUESDAY.—5 P.M., Dr. G. B. Dowling: Pityriasic Dermatitis.
WEDNESDAY.—5 P.M., Dr. I. Muende: Elements of Histopathology.
THURSDAY.—5 P.M., Dr. W. N. Goldsmith: Pigmentary Disorders.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY.—2 P.M., Dr. Reginald Lightwood: Care of the Premature Infant. 3 P.M., Mr. T. Twistington Higgins: Pyloric Stenosis and its Treatment.
Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.
FRIDAY.—4. 30 P.M., Dr. Albert Eidinow: Physical Medicine in Diseases of the Skin.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY.—4 P.M., Mr. A. Lowndes Yates: Nasal Obstruction.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY.—4.15 P.M. (Royal Infirmary), Dr. J. N. Cruickshank: Nephritis.

Births, Marriages, and Deaths

BIRTHS

CHANCE.—On Dec. 28th, at Dublin, the wife of Dr. Oliver Chance—a daughter.
DAVIDSON.—On Jan. 2nd, at Hartley, Plymouth, the wife of Dr. Stephen M. Davidson—a son.
EDEN.—On Jan. 2nd, at Heath-street, Hampstead, the wife of Mr. Kenneth Eden, F.R.C.S. Eng.—a daughter.
GIBSON.—On Dec. 24th, at St. Thomas's Hospital, the wife of Dr. Thomas Gibson—a daughter.
GRACE.—On Jan. 1st, at London, Ont., Canada, to the wife of Mr. Archibald J. Grace, F.R.C.S.—a son.
HOBDAY.—On Dec. 28th, at Yeovil, Somerset, the wife of Dr. F. T. J. Hobday—a daughter.
INGRAM.—On Dec. 24th, at the Middlesex Hospital, the wife of Mr. Peter Ingram, F.R.C.S.—a daughter.
MCNIE.—On Dec. 30th, at the British Military Hospital, Lahore, the wife of Captain T. McG. McNie, R.A.M.C.—a son.
RIVERS-MOORE.—On Dec. 28th, at Port Shepstone, South Africa, the wife of Dr. Francis Rivers-Moore—a son.
ROBERTSON.—On Dec. 30th, at Winchester, the wife of Dr. Kenneth Robertson—a daughter.
THORPE.—On Jan. 1st, at Cambridge, the wife of Dr. W. H. Thorpe—a daughter.

MARRIAGES

CLEMENTS—BARDSWELL.—On Dec. 29th, at Holy Trinity Church, Southport, Albert James Clements, M.B., to Jean Hamilton, only daughter of the late Hamilton Bardswell and of Mrs. Hamilton Bardswell, of Southport.
KERBY—AGNEW.—On Dec. 24th, at Durban, South Africa, Theodore Rosser Fred Kerby, M.R.C.S., to Mrs. Constance Mary Agnew, widow of Ewan Siegfried Agnew, Durban.
LEE—FISCHER.—On Dec. 21st, in Budapest, Ralph Owen Lee, F.R.C.S., of Northampton, to Szepesy Fischer (Clára), of Budapest.
SPENCER—RAM.—On Dec. 28th, in Sydney, N.S.W., Stanley Livingstone Spencer, F.R.C.S., to Doris Marion, only child of Capt. Percival Scott Ram, of Guildford, Surrey.

DEATHS

BLACK.—On Jan. 3rd, at Hurstpierpoint, Sussex, George Black, M.B. Lond., Major, R.A.M.C. (T.), aged 73.
BROUN.—On Dec. 26th, at Higher Woodway, Teignmouth, Lieut.-Colonel William Hamilton Broun, late R.A.M.C.
BULLMORE.—On Dec. 27th, at Sydney, Herbert Henry Bullmore, M.B., M.R.C.P. Edin.
CANT.—On Jan. 2nd, in Salford Hospital after a road accident, Frederick Vaudrey Cant, M.A. Camb., M.R.C.S. Eng., D.P.H., chief medical officer of Manchester Associated Collieries, aged 46.
CARLISLE.—On Jan. 2nd, Geoffrey Carlisle, M.R.C.S. Eng., retired Surg. Capt., R.N., son of the late Paymaster-in-Chief John Carlisle, R.N.
GRIFFIN.—On Dec. 26th, at Cliftonville, William Watson Griffin, M.B. N.Z., F.R.C.S. Eng.
HOLMES.—On Dec. 31st, Thomas Daniel Hill Holmes, M.D. Edin., J.P., of Woburn Sands, aged 71.
JAMESON.—On Jan. 2nd, at Fleet, Hants, Surg. Capt. Robert Dundonald Jameson, C.M.G., L.R.C.P. Edin., R.N., retd.
JOHNSTON.—On Dec. 29th, at Leadenham, Thomas Leonard Johnston, L.R.C.P. Edin., formerly medical superintendent of Bracebridge Mental Hospital, in his 75th year.
MAUNSELL.—On Dec. 29th, at Uxbridge, Major-General T. Maunsell, C.B., LL.D., A.M.S. (retd.), in his 99th year.
MILLSON.—On Jan. 3rd, at Angell-road, S.W., George Millson, O.B.E., M.R.C.S. Eng., late M.O.H., Borough of Southwark, in his 94th year.
MORGAN.—On Dec. 26th, David Morgan, M.B. Edin., of Heathcroft, Hampstead-way, N.W., ex-medical superintendent of the Cunard Line.
ORR.—On Dec. 27th, at Biarritz, A. W. Orr, M.D. Dubl., eldest son of the late Major A. Orr, R.A., aged 75.
SHIPTON.—On Dec. 28th, at Buxton, Arthur Shipton, F.R.C.S. Edin., J.P., aged 82.
SMITH.—On Dec. 30th, at Heavitree-road, Plumstead, Frank Wybourn Smith, M.R.C.S. Eng., aged 58.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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NOTES, COMMENTS, AND ABSTRACTS

COMPENSATION FOR SILICOSIS IN DIFFERENT COUNTRIES

THE International Labour Office has taken an interest in silicosis from its foundation. The latest publication on the subject[1] records the extent to which the principle of compensation for silicosis and allied diseases has been recognised throughout the civilised countries of the world. Compensation is provided by legislation for this most serious of all industrial diseases in Great Britain, Canada, Australia, New Zealand, and South Africa, in nearly all the countries of Europe, including the U.S.S.R., in the Americas and in Japan.

For illustrative purposes three systems of legislation are detailed, the special legislation in the Union of South Africa, the special schemes in Great Britain, and the schedule in Germany. The systems are divided, for purposes of comparison, under the following heads: legislation, scope of legislation, right to compensation, certification of the disease, benefits, review, procedure for settling disputes, administration of compensation, and prevention.

UNION OF SOUTH AFRICA

Compensation for silicosis is accorded in virtue of special Acts, consolidated and amended in 1925, and Government notices. The legislation applies only to scheduled gold-mines in the Witwatersrand and gazetted mines outside that area. The Minister of Mines decides on the places to which the Acts apply, and the Government mining engineer on the persons covered by them. The right to compensation is based on a diagnosis of silicosis with or without tuberculosis, and tuberculosis alone. Silicosis is recognised in three stages: ante-primary, primary, and secondary, according to the degree of incapacity or the appearance of tuberculosis. Tuberculosis of the lungs is recognised when open, or when closed, with serious impairment of working capacity. A claim for compensation is based on five years' work in a scheduled mine, and must ordinarily be submitted within five years of leaving the employment, but this rule is waived under certain conditions. Native workers have similar rights.

A claim for compensation on account of tuberculosis is based on employment for twelve months in a scheduled mine and a diagnosis of tuberculosis within twelve months of leaving it (in native labourers these periods are respectively one month and six months). In fatal cases compensation is payable to dependants. The certificates entitling to benefit are granted by the Miners' Phthisis Medical Bureau, and the claims are dealt with by the Miners' Phthisis Board. An appeal may be made from the decision of the Medical Bureau to the Medical Board of Appeal, whose decision is final. The system of insurance is based on the collective liability of employers, for native labourers the individual employer is responsible. Four distinct funds are maintained for meeting claims and expenses, including liabilities arising from mines which have closed down.

GREAT BRITAIN

Here compensation for silicosis is provided by various schemes applying to different industries or processes made under Section 47 of the Workmen's Compensation Act, 1925. Four separate schemes relate to metal grinding, refractories, sandstone, and various industries grouped together, including metalliferous and coal mining and other processes in handling silica in which there is exposure to the dust. The right to compensation is based on a diagnosis of silicosis, which is regarded as fibrosis of the lungs due to silica dust, as well as silicosis accompanied by tuberculosis; accordingly, the definitions of the processes covered by each scheme is related to exposure to the inhalation of silica dust.

Compensation is provided in respect of compulsory suspension from employment, disablement, or death, on account of silicosis or silicosis with tuberculosis (not for tuberculosis alone). Where the workman has been employed in the processes for not less than five years the disease is deemed to be due to the employment, otherwise the onus of proof is on the workman or his dependants. Application must be made within three years of leaving the employment (except in the refractories industries). Certificates entitling to compensation can only be granted by the Silicosis Medical Board, appointed by the Secretary of State; there is no appeal, but re-examinations are allowed after an interval. Certificates issued at the statutory periodical medical examinations, required in the refractories, sandstone, and pottery industries, are issued free, otherwise the workman pays a specified fee for examination. Certificates for fatal cases are in general issued only after a post-mortem examination. The benefits are substantially as in disablement or death from accidents or other industrial diseases. The amount payable for partial disablement varies with the degree of impairment of physical capacity. Compensation for silicosis is based on the principle of employers' liability. In the refractories and the sandstone industries the liability is collective; all employers have to subscribe to a general compensation fund. Under the other schemes the individual employer is liable and he may insure against his liability.

GERMANY

Silicosis is compensated in virtue of the third Order of Dec. 16th, 1936, relative to the extension of accident insurance to cover occupational diseases. The schedule appended to the Order includes (*a*) serious pneumoconiosis (silicosis), (*b*) pneumoconiosis (silicosis) occurring in conjunction with pulmonary tuberculosis when the general clinical picture is serious and the pneumoconiotic lesions constitute the essential cause of the active and progressive evolution of tuberculosis. The disease is compulsorily notifiable by the employer and the doctor who makes the diagnosis, to the accident association which is the institution responsible for insurance. Any medical practitioner who discovers the disease in a patient under his care or at a post-mortem examination is required to notify the case. (Similar notification is required in South Africa but not in Great Britain.) The notification goes finally to the factory inspector and the Government medical inspector, who has the patient examined at the expense of the accident association for an opinion on the connexion between the disease and the man's work.

Benefits are of two types: in kind (medical treatment, vocational rehabilitation, or training in a new occupation) or in cash. Cash benefits equal to half the basic wage are provided for forty-five days by the sickness fund and after that by the accident association. Pension (after six months) may amount to two-thirds of earnings or less according to loss of earning capacity. In fatal cases benefits are paid as pension to the dependants. The question of revision of pension can be raised by the workman or the accident association, and appeals are dealt with by the Federal Insurance Office. The financial resources of the accident association are derived from contributions from their members assessed annually on a system controlled by the Federal Insurance Office.

Measures for prevention of industrial diseases are initiated through the factory inspectorate as the result of notification by the medical attendant. The accident associations issue regulations to employers and workers for the prevention of occupational

[1] Workmen's Compensation for Silicosis in the Union of South Africa, Great Britain, and Germany. International Labour Office, Studies and Reports, Series F (Industrial Hygiene), No. 16, 1937. London: P. S. King and Son, 14, Great Smith-street, S.W.1. Pp. 147. 3*s*. 6*d*.

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disease, and provide inspectors under official control to see that these are carried out.

APPENDICES

Over a third of this publication is devoted to seven informative appendices. These describe compensation of occupational diseases by the system of blanket coverage—the law in Wisconsin being taken as an example; the radiological technique and classification of silicosis; silicosis statistics; and a table showing the legislation in force for compensation for pneumoconiosis in some fifty different countries and States.

NARCOTIC DRUGS: THE WORLD'S REQUIREMENTS

THE supervisory body set up by the Convention of 1931 for controlling the distribution of narcotic drugs has issued a statement giving the estimated world requirements of dangerous drugs for 1938. The grand totals for morphine, heroin, and cocaine are, respectively, 45,638 kg., 1133 kg., and 5032 kg. It has, however, to be borne in mind that in the case of morphine the amount required for consumption as such is 10,126 kg., while no less than 35,395 kg. is utilised for conversion into other drugs, such as codeine and dionine. A comparison of the approved estimates for the years 1934–38 shows the figure for morphine to be fairly constant at about 9000–10,000 kg., with heroin about 1000 kg. and cocaine 4000–5000 kg. Several countries party to the 1931 Convention are remarkably remiss in furnishing their estimates—notably Cuba, Mexico, Peru, Panama, and Ecuador. In these cases the supervisory body is authorised, under Article 5 of the Convention, itself to prepare the estimates for such countries.

The tables annexed to the statement exhibit interesting variations in the estimates vouchsafed: in Europe the largest consumers of morphine are Soviet Russia, Germany, and France; in Asia the largest consumer is Japan, while the United States of America supply the highest estimate for morphine for 1938 of any country—namely, 8653 kg. In the case of heroin, on the other hand, the United States' estimate is nil; that of Soviet Russia heads the list with 350 kg., followed by Japan 180 kg., and Italy 171 kg. The figures for Great Britain are of morphine 2114 kg. and heroin 56 kg.

The Permanent Central Opium Board, which met in Geneva in November last under the chairmanship of Mr. Lyall, reviewing the work of 1937 up to the date of its meeting, called attention to absence of information from Iran in regard to raw opium, although that country is one of the greatest producing countries of the drug. Likewise Bolivia and Peru failed to supply information in regard to their stocks of coca leaves, of which they are two of the largest producers. The Board says that though seizures of morphine in recent years have not been of great importance "it would be dangerous to conclude that the illicit traffic is also negligible."

ANTI-SYPHILIS PROPAGANDA

NOBODY will question the wisdom of spreading light about syphilis though there may well be differences of opinion as to how this may best be achieved. Propaganda, if it is to be read at all, must catch the eye, and so far the writers and publishers of two recent "popular" books on syphilis may be forgiven, the one for an alarmist title, the other for a lurid cover. Dr. Becker's book[1] is short and simple. He pleads for a broader view about syphilis, and outlines its history, course, and cure. He has a chapter on the causal organism and another on what he calls "pre-natal" syphilis, a term he prefers to "congenital" on what seem hair-splitting grounds. All this is unexceptionable; but a chapter entitled "How they get it" strikes a terroristic note by its undue insistence on the possibility of innocent infection. By way of illustration the author quotes two cases from his own experience, one of a man who was infected by a blow from the fist of a syphilitic, and the other of a child infected by eating an apple polished with the infected sputum of a street vendor. Now it is not denied that such things do happen but, like lonely people who keep a frog, they must be extremely rare, and there can be no point in stressing them in a work intended for the layman. Dr. Breger's book[2] is even more alarming. On the cover is depicted a green-headed snake, presumably symbolising the *Spirochæta pallida*, which is held by the neck in the vice-like grip of (no doubt) a heroic syphilologist about to administer a full dose of neo-arsphenamine. The book itself is full of simple graphs and diagrams, macabre posters and coloured plates, and contains one particularly revolting photograph of a nude mercifully blindfold and covered with a rash. By appealing to fear rather than to common sense the authors in our view weaken their case and fail in a large measure to do what they set out to do. Propaganda along these lines is surely less likely to impel ths syphilitic to seek early medical aid than to foster the growth of syphilophobia, a disease which once implanted, as every practitioner knows, is as hard to eradicate as a fear of cancer and the cause of as much needless suffering.

SPERMATIC ABNORMALITIES

IN the investigation of male fertility most progress is at the moment being made by semen analysis. It was Moench, in 1928, who first called attention to the importance of estimating the ratio of abnormal to normal spermatozoa, and he concluded that a coefficient of variability in excess of 11·5 means disturbance in spermatogenesis. Dr. W. W. Williams, who writes on this subject in the *New England Journal of Medicine* for Dec. 9th last, concerns himself with more common forms of abnormal spermatozoa and groups them under five headings: (1) spermatozoa with pyriform heads; (2) microspermia; (3) megalospermia; (4) spermatozoa with abnormalities of the acrosome; and (5) miscellaneous types. The aim of his investigation has been to provide a classification that will give comparable results in the hands of different observers, so that the relation of spermatic structure to function may be better appreciated.

THE HANDBOOK OF THE KITCHENETTE

Miss Bond[3] does not admit that the tin-opener is the badge of a lazy housewife; she champions the thoughtful use of canned foods as a means to relieve the busy woman of much of the drudgery of preparing, cooking, and washing up of meals, and very well she puts her case. The booklet is very practical and most of it is taken up with information about the varieties of foods canned, recipes for using such foods, detailed kitchen lore and kitchen planning, but Miss Bond finds space for some elementary dietetics and facts as to the safety and wholesomeness of canned foods. Naturally she is partisan but scientific knowledge is on her side in asserting that the nutritive value and safety of canned foods is not less and may be greater than that of uncanned foods. What the book does not contain is any comparison of the cost of fresh and canned foods, allowing of course, as is proper, for the cost of preparation. For the salaried woman worker living alone the book will be invaluable since the actual cost of foodstuffs, if the differences are small, is far less important than the question of labour and convenience. For working-class families

[1] Ten Million Americans Have It! By S. William Becker, M.S., M.D., associate professor of dermatology and syphilology, University of Chicago. London: J. B. Lippincott. 1937. Pp. 220. 6s.

[2] Die Geschlechtskrankheiten. By Dr. med Johannes Breger, Oberregierungsrat i.R., Leiter der Ortsgruppe Berlin der deutschen Gesellschaft zur Bekämpfung der Geschlechtskrankheiten. Berlin: R. v. Decker's Verlag G. Schenck. 1937. Pp. 150.

[3] Janet Bond's Book. A practical guide to the use of canned foods. Published by the Canned Foods Advisory Bureau Ltd. Free.

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where every penny counts the cost factor is the main consideration. The place that canned foods can legitimately occupy in the dietary of the working classes is not considered by Miss Bond. For some foods they are probably economical, for others not. A careful comparison of the relative cost of the common fresh and canned foods as they reach the table is a piece of work that needs to be done.

DEDUCTIONS FROM INCOME TAX

FEW practitioners have time to study the complications of income tax law. Those who want to know the deductions chargeable against profits by a professional man will find in a little book recently published [1] concise and practical advice about the allowance of such expenditure as subscriptions to defence societies or to professional journals; the purchase of periodicals for the waiting-room; the deductions permissible where the doctor has a consulting-room and waiting-room in the house in which he lives; or, if he has a separate surgery, the allowance of a reasonable proportion of domestic expenditure. Under this last heading the telephone bill, for instance, may be largely treated as a charge against profits. The professional man must often be unaware of deductions which he is perfectly entitled to make. Within its own range Mr. Adlard Coles and Mr. Macdonald can fairly claim that their book justifies its title.

REPORT ON SISTER KENNY'S TREATMENT OF PARALYTICS

IN June, 1935, at the request of the Minister of Health for New South Wales, a clinic was opened at the Royal North Shore Hospital in Sydney to give Sister Kenny an opportunity of carrying out her method of treating cases of various types of paralysis under medical supervision. Her method consists essentially in early passive movements, graduated exercises, massage, and hydrotherapy, and in dispensing with splints. A committee of the hospital staff, with Dr. W. W. Ingram as chairman, was appointed to investigate her results, and their interim and final reports as submitted to the Minister are now published.[2] Sister Kenny selected 15 patients for investigation, including 10 cases of infantile paralysis of from 7 months to 15 years' duration, and 5 of cerebral diplegia. These patients had been under treatment at her clinic for from one to eleven weeks before the committee examined them. None of them had been consistently under the care of an orthopædic surgeon before that, and their previous treatment appears to have been quite inadequate. A careful assessment of the muscle power and degrees of deformity of these patients was made by the committee and re-examinations were carried out after from five to fourteen weeks treatment, and again about three months later. The period of observation was too short for any very definite conclusions to be arrived at, but the committee found that 8 of the 10 cases of infantile paralysis showed some improvement in muscle power, though most of the completely paralysed muscles were unchanged; there was a general improvement in the tone of muscles not paralysed, and in some patients deformities and stiffness of joints became less marked. All the cases of cerebral diplegia were improved, especially in regard to incoördination and involuntary movements; the children were calmer and less emotional, muscular hypertonicity was generally less, and the range of movement at a number of joints had increased. The committee concluded, however, that these 15 patients had not improved either more quickly or more extensively than would have been expected with orthodox methods. They agreed that Sister Kenny had not introduced any new principles except the absence of splinting, and that the effects of this could not be determined until a sufficient number of acute cases had been followed up over a long period and compared with controls. The committee expressed the belief, however, that efficient splinting as well as re-education of muscles under expert supervision is desirable. They noted that Sister Kenny had rendered a useful service by drawing the attention of the government and the public to the need for some general orthopædic scheme in Australia, and suggested that her trainees might well play a considerable part in such a scheme.

AIR-RAID PRECAUTIONS IN SCHOOLS

Circular 1461 (price 1*d.*) issued by the Board of Education, after consultation with the Home Office, suggests the precautions to be taken in schools in the event of an air-raid. Each authority is to decide for itself whether the schools are to be closed or not during the time that raids are to be expected. The children's safety comes first, but the public should not be unsettled by unnecessary dislocation of normal services. In districts that are safer than the children's homes, schools, especially boarding schools, should remain open. If the position of a school is so dangerous that it must be closed, arrangements ought to be made for affiliation with a better-placed neighbour. Schools should only be used as first-aid posts if other buildings are not available and alternative provision should then be made for continuing education. Plans for an emergency should be worked out in advance and made known to the teachers, a proportion of whom ought to learn the elements of first-aid and anti-gas measures, but they need not try to become experts. Children attending schools that are kept open are to carry their respirators to and from school. Instructions in peace time about using these are thought undesirable, for there will be ample opportunity under the arrangements made for the rest of the family. Where the danger is great children should be kept at home to share in the measures for protecting the general public, since the warning period is not expected to be more than 10 minutes. School buildings do not lend themselves to the structural changes required for protection because these would interfere with the free lighting and ventilation. Exceptionally, however, shelter trenches or rooms prepared against gas or splinters from bombs might be provided.

MATERNAL DEATHS IN AMERICA

UNDER the auspices of the Commonwealth Fund Dr. Iago Galdston, secretary of the medical information bureau of the New York Academy of Medicine, has written a little book [1] intended for laymen which is based primarily on the Report on Maternal Mortality in New York City published by the Fund in 1933.[2] This report showed that during the years 1930 to 1932 no less than 65·8 per cent. of the 2041 deaths in the city were preventable. Some striking figures are given; for example, that the attendant at 56·6 per cent. of the fatal cases was an obstetrician, at 28·3 per cent. a general practitioner, and at 10 per cent. a midwife. The number of cases attended by each of these classes is not given, nor the criterion for giving any doctor the title of obstetrician. The position of midwives in New York seems to be similar to that in England before 1902. No mention is made of the results obtained in countries where properly trained and properly controlled midwives conduct the majority of normal labours. The danger of inefficient maternity hospitals is stressed and a list of essential requirements for a maternity unit is given. In New York and Philadelphia no less than 70 per cent. of deliveries occur in hospital, and the available evidence suggests that widespread

[1] Income Tax Explained. By K. Adlard Coles, M.A., F.C.A., and John Macdonald, M.A. London: Jordan and Sons. 1937. Pp. 181. 5*s.*

[2] *Med. J. Aust.* Nov. 13th, 1937, p. 888.

[1] Maternal Deaths—The Ways to Prevention. New York: The Commonwealth Fund; London: Humphrey Milford, Oxford University Press. 1937. Pp. 115. 3*s.* 6*d.*

[2] See *Lancet*, 1934, 1, 135.

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hospitalisation increases the death-rate from sepsis and decreases the rate from other causes. In one hospital 50 per cent. of the patients in private wards were delivered with the aid of instruments, while in the public wards of the same hospital the corresponding figure was 4 per cent. The author suggests that the present generation has not produced a race of mothers different biologically from their predecessors but a different race of obstetricians. The author does not apportion the blame for the 50 per cent. forceps rate and 5 per cent. Cæsarean rate wholly to the medical profession but realises and explains the danger of interference by the patient or her friends with the judgment of the doctor. Excluding abortions and ectopics, 45 per cent. of the deaths followed operative delivery and 20 per cent. followed Cæsarean section. The conclusion reached is summarised as follows: "There are in this problem of maternal mortality many interdependent factors, but two amongst these factors stand out most prominently. Behind much of bad obstetrics are bad economic conditions, affecting physician and patient alike; and better instruction is needed by various groups—and most emphatically by the public."

Appointments

EDWARDS, COLIN, M.B. Sydney, M.R.C.P. Lond., D.P.M., Hon. Assistant Physician to the West End Hospital for Nervous Diseases, London.

Certifying Surgeons under the Factory and Workshop Acts: Dr. W. J. S. FITZMAURICE (Studley District, Warwick); Dr. C. S. APPLEYARD (Bedworth District, Warwick).

Vacancies

For further information refer to the advertisement columns

Barnsley, Beckett Hosp. and Dispensary.—H.P., £200.
Belgrave Hosp. for Children, Clapham-road, S.W.—Asst. Physician, 50 guineas.
Birkenhead Municipal Hosp.—Deputy Med. Supt., £450.
Birmingham, Children's Hosp.—Receiving Room Officer, £250. Res. Sen. Cas. H.S., £125. Also First Asst. to Orthopædic Dept., £100.
Birmingham City Education Committee.—Asst. School M.O., £500.
Blackburn County Borough.—Asst. M.O.H. and Asst. School M.O., £600.
Bolingbroke Hosp., Wandsworth Common, S.W.—H.P., at rate of £120.
Bootle General Hosp.—H.P., two H.S.'s, and Cas. O., each at rate of £150.
Bradford, Royal Eye and Ear Hosp.—H.S., £180.
Bristol Royal Infirmary.—Sen. Cas. H.S. and Sen. Obstet. H.S., at rate of £150 and £100 respectively. Also H.P.'s and H.S.'s, each at rate of £80.
Bristol, Southmead Municipal General Hosp.—Jun. Asst. Res. M.O., at rate of £200.
Cambridge, Addenbrooke's Hosp.—Hon. Dental Surgeon.
Cardiff, Welsh National School of Medicine.—David Davies Professorship of Tuberculosis, £1500.
Charing Cross Hosp., W.C.—Res. House Anæsthetist and Asst. Cas. O., £150.
Cheshire, St. Anne's Home, Altrincham.—Res. Surg. O., £200.
Chesterfield, Walton Sanatorium.—Jun. Res. Asst. M.O., £350.
Colchester, Severalls Mental Hosp.—Asst. M.O., £510.
Dagenham Urban District Council.—Asst. M.O.H., £600.
Dartford Rural District Council.—Part-time M.O., at rate of £250.
Devonport, Prince of Wales's Hosp.—Jun. H.S., at rate of £120.
Durham County Hosp.—H.S., at rate of £150.
Ealing Borough.—Asst. M.O., £600. Res. Asst. M.O., £350. Also Ophth. Surgeon, £275.
East Ham Memorial Hosp., Shrewsbury-road, E.—Res. M.O., at rate of £200.
Evelina Hosp. for Sick Children, Southwark, S.E.—H.P., at rate of £120.
Golden-square Throat, Nose, and Ear Hosp., W.—H.S., £100.
Grimsby and District Hosp.—Sen. and Jun. H.S.'s, at rate of £200 and £150 respectively.
Guildford, Royal Surrey County Hosp.—H.S., at rate of £150.
Hampstead General and N.W. London Hosp., Haverstock Hill, N.W.—H.P. and H.S., each at rate of £100.
His Majesty's Colonial Service.—M.O.'s, £600–£700. Also Asst. Med. Supt. for Central Mental Hosp., Tanjong Rambutan, £840.
Hosp. for Sick Children, Great Ormond-street, W.C.—Cas. M.O. at rate of £175.
Hove General Hosp.—Hon. Clin. Assts. for Gynæcological Dept. and Ear, Nose, and Throat Dept.
Huddersfield, St. Luke's Hosp.—Res. M.O., £230.
Infants Hosp., Vincent-square, Westminster, S.W.—Res. M.O. £300.
Islington Metropolitan Borough.—Asst. M.O., £600.
Kidderminster and District General Hosp.—Jun. H.S., £100.
King's College Hosp., Denmark-hill, S.E.—Asst. Physician.
Leeds City.—Asst. M.O., £500.
Leeds, Killingbeck Sanatorium.—Sen. Asst. Res. M.O., £425.
Leicester, City Mental Hosp., Humberstone.—A.M.O., £350.
Leicester Royal Infirmary.—Res. Anæsthetist, at rate of £150.
Liverpool Dental Hosp., Pembroke-place.—Hon. Anæsthetist.
Liverpool School of Tropical Medicine.—Asst. Lecturer in Dept. of Entomology, £400.
London County Council.—Asst. Pathologist, £650.
London Hosp., E.—Med. First Asst. and Reg., £300. Also First Asst. to Dept. of Thoracic Surgery, £150.
London Jewish Hosp., Stepney Green, E.—Surg. Reg., 60 guineas.
London University.—University Chair of Medicine at St. Bartholomew's Hospital Medical College, and University Chair of Surgery at University College Medical School, each £2000. Also University Readership in Medical Parasitology at London School of Hygiene, £900.
Maidstone, Kent County Ophthalmic and Aural Hosp.—Ophth. H.S., at rate of £200.
Manchester, Ancoats Hosp.—Pathologist and Radiological Officer, each £400.
Manchester Northern Hosp., Cheetham Hill-road.—Res. H.P. and Res. H.S., each at rate of £100.
Metropolitan Hosp., London, E.—Hon. Anæsthetist, £25.
Middlesbrough Education Committee.—Asst. School M.O., £500.
National Temperance Hosp., Hampstead-road, N.W.—Hon. Anæsthetist. Hon. Ophth. Surgeon. Also Med. Reg., 40 gns.
Northampton, St. Andrew's Hosp. for Mental Diseases.—Res. Med. Supt., £2000.
Norwich, Norfolk and Norwich Hosp.—H.S. to Special Depts. and General H.S., at rate of £160 and £120 respectively.
Plymouth, Prince of Wales's Hosp., Greenbank-road.—H.S., at rate of £120.
Poplar Hosp. for Accidents, East India Dock-road, E.—Second Res. O., at rate of £175.
Preston, County Mental Hosp., Whittingham.—Res. Jun. Asst. M.O., £500.
Preston, High Carley Sanatorium, Nr. Ulverston.—Jun. Asst. M.O., £300.
Richmond Royal Hosp., Surrey.—Jun. H.S., £100.
Royal Air Force.—Temporary Civilian Dental Surgeons.
Royal Cancer Hosp., Fulham-road, S.W.—Res. M.O., £200.
Royal Masonic Hosp., Ravenscourt Park, W.—Res. Surg. O., at rate of £250.
Royal National Orthopædic Hosp., 234, Great Portland-street, W.—Two H.S.'s for Country Branch, each at rate of £150.
Royal Naval Medical Service.—M.O.'s.
St. Thomas's Hosp., S.E.—Asst. Physician to Dept. of Psychological Medicine.
Sheffield Royal Infirmary.—Sen. Cas. O. and H.P., at rate of £150 and £80 respectively.
Southend-on-Sea General Hosp.—First H.S., at rate of £100.
South Shields, Ingham Infirmary.—Jun. H.S., £150.
Stafford, Coton Hill Mental Hosp.—Asst. M.O., £400.
Stockport Infirmary.—Res. Surg. O., £250.
Taunton and Somerset Hosp.—H.S., £125.
Tunbridge Wells, Kent and Sussex Hosp.—H.S. to Ear, Nose, and Throat Dept. and Res. Anæsthetist, £150.
Victoria Hosp. for Children, Tite-street, Chelsea, S.W.—Ophth. Surgeon. H.P. and H.S., each at rate of £100. Also Out-patient Anæsthetist, 10*s.* 6*d.* per attendance.
West Bromwich, Hallam Hosp.—H.P., at rate of £200.
West End Hosp. for Nervous Diseases, 73, Welbeck-street, W.—Hon. Med. Psychologists. Two Res. H.P.'s, each £125. Also Registrar to Out-patient Dept., £200.
Wolverhampton and Midland Counties Eye Infirmary.—H.S., £150.
Wolverhampton Royal Hosp.—Asst. Res. M.O. for Gynæcological and Obstet. Dept., at rate of £100.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Worthing (Sussex) and Sheffield (East) (Yorks, W.R.).

CAIRO OPHTHALMOLOGICAL CONGRESS.—The fifteenth Concilium Ophthalmologicum was opened in the new university building at Cairo by King Farouk I on Dec. 7th, when Dr. A. H. H. Sinclair (Edinburgh) spoke for the representatives of Great Britain. Discussions went on for the following week, the leading subjects being arterial hypertension of the retina, opened by Drs. Wagener and Keith (U.S.A.), and endocrinology of the eye, opened by Prof. I. Snapper (Amsterdam). About a hundred papers were read in all. Visits were paid to the Memorial Ophthalmic Laboratory at Giza where trachoma and spring catarrh especially are being studied under the direction of Dr. R. P. Wilson, and the view is gaining ground that trachoma is a virus disease, possibly some form of rickettsiosis; and to No. 1 Ambulatory Hospital situated near the Citadel, staffed entirely by Egyptian oculists, which moves from village to village in a campaign against trachoma and ophthalmia.

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ADDRESSES AND ORIGINAL ARTICLES

NUTRITION AND NUTRITIONAL DISEASES *

BY LEONARD G. PARSONS, M.D., F.R.C.P. Lond.
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II—RÔLE OF VITAMIN C IN DISEASE

ALL the vitamins have some function to perform in the chemistry of the cell, and in their absence, although the cells concerned may still survive and be capable of growth and multiplication, they exhibit structural changes. The particular cells involved vary with the different vitamins; thus, the specific effect of vitamin A is on epithelial cells, that of the B complex on the nerve-cell; vitamin C affects all supporting tissue cells and D the cartilage cells. Vitamin C has, in addition to its specific action of regulating the colloidal condition of intercellular substance in all mesenchymal structures, another important specific function in the body—a respiratory one—since it forms an oxidation-reduction system in the cell. Hence a deficiency of it may be the basis of many pathological changes, and it is not surprising that this has been invoked as the cause of many disease processes, especially those connected with the hæmorrhagic states. Many of these suggestions are so inaccurate as to be utterly absurd. There is a deplorable amount of what the Americans call "commercial ballyhoo" concerning the vitamins, but the claims put forward for them must be investigated because sometimes things revealed to babes are hidden from the wise. (The 1929 epidemic of psittacosis owed the discovery of its origin to a chance remark of a young child that "I know what is the matter with auntie—it is what the parrot has," knowledge which until then had been denied to a colleague of mine.) I propose to look at the less fantastic of these claims to see if there is any evidence that vitamin C is concerned in any other condition than frank scurvy.

On an adequate diet, breast milk contains 0·06–0·08 mg. of vitamin C per c.cm. which is more than enough for the needs of the infant (20 mg. ascorbic acid daily), but on inadequate diets it may sink as low as 0·01–0·02 mg. per c.cm. (Selleg and King 1936). Fresh cow's milk contains a third to a sixth the amount present in breast milk, and further amounts are lost by pasteurisation, ageing—especially if exposed to light—and by reheating. Cow's milk also contains an oxidase that is able to convert the vitamin to its oxidised and inactive form, and pasteurisation instead of accelerating oxidation may sometimes inhibit it by destroying more of the oxidase than the acid. The presence of copper in small amounts, as by storage in copper vessels, also increases oxidation. Sharp (1936) gives the following values for ascorbic acid per litre of cow's milk:—

Fresh milk	20·1 mg.
After three days at a temperature of 2° C. ..	11·3 "
After pasteurisation at 62°–63° C. for 30 minutes	11·0 "
After pasteurisation if copper is present	1·7 "

Of the vitamin-C intake, a considerable proportion is lost in the stool, some in the urine, some destroyed in the alimentary tract, and the rest stored and utilised. There is no evidence of any serious loss during absorption. The vitamin is stored in the highest concentration in the pars intermedia of the pituitary gland; high concentrations are also found in the anterior lobe of the pituitary, the adrenals—particularly the cortices—the corpus luteum, the interstitial cells of the testes, the tonsils, and to a lesser degree in the liver, spleen, &c. Many of the organs in which it is present in largest amount are associated with sex changes, and it has been shown (Glick and Biskind 1936) that the fluctuation of vitamin-C content of the corpus luteum parallels the changes in the amount of luteal hormone—progesterone—in the gland, an association which may prove to be of considerable significance. The vitamin is present in the blood and urine in its reduced form and in the tissues in its reversibly oxidised inactive form—dehydro-ascorbic acid.

Certain animals, for instance the cow, rat, mouse, and fowl, can synthesise vitamin C and therefore do not require it in the diet. Röhmer and Bezssonoff (1935) claim that the human infant under a year old should be added to this list of animals; this I find it impossible to accept. It is the capacity for synthesising vitamin C that accounts for its low percentage in cow's milk.

Gross deficiencies of vitamin C lead to the development of scurvy, but occasionally, as I pointed out in the first lecture, scurvy occurs even when the diet contains considerable quantities of vitamin C; an infant admitted to the Children's Hospital with frank scurvy was having daily orange juice containing 60 mg. of ascorbic acid. We have suspected that this might be due to lack of absorption, though we have not been able to demonstrate this chemically. Indeed, in the case to which I have just referred, cure was actually obtained by giving large doses of ascorbic acid by mouth. It is probable that some children require more vitamin than others.

Until vitamin C was synthesised the human race was dependent upon the annual crops of fruit and vegetables for its antiscorbutic food, a veritable hand-to-mouth existence that led to severe epidemics of scurvy, as in Ireland and Norway when the potato crops failed. It has been stated that this synthesis "may have more far-reaching effects on the welfare of the race than the work which has been done on all other vitamins put together."

The time required for the development of frank scurvy on an inadequate diet in the infant is about 6 months (2–9 months Park, Guild, Jackson, and Bond 1935), but usually only from 4–8 weeks in the adult. This difference is said to be due to the fact that the diet of the adult sufferer is more likely to be free from vitamin C than even that of a child on pasteurised milk. There are, however, at least two other possibilities: first, that as with thyroxin and vitamin D, the new-born baby starts with a store of vitamin C obtained from its mother during pregnancy; secondly, the effect of trauma in determining the occurrence of certain symptoms of scurvy is much more likely to be a factor in the adult than the infant. If trauma is ever a factor in the onset of infantile scurvy, it is probably self-inflicted. Despite the long latent period the symptoms of acute infantile scurvy appear suddenly and it is much more probable that some infection, perhaps only slight, is the real exciting factor—the onset of an infection fanning the smouldering embers of the latent disease into the blazing fire of frank scurvy. A similar state of affairs occurs in another vitamin-deficiency disease—tetany. A child with symptomless latent tetany contracts a slight infection and tetany becomes manifest

* Withering lectures (abridged) delivered before the University of Birmingham on May 11th and 13th, 1937.

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as a convulsion. An interesting parallel to the sudden onset of the symptoms in acute scurvy is presented by their rapid cure when large doses of ascorbic acid are administered; the paralysed child crying with apprehension and pain will in 48 hours move its legs freely and allow them to be handled almost with impunity.

Latent Scurvy

Admitting the existence of a long latent period in scurvy, the question has often been asked whether it is possible by clinical signs and symptoms or by chemical tests to determine the presence of a condition which has received various designations—latent scurvy, sub-scurvy, scorbutic dystrophy—exactly as latent tetany can be diagnosed by clinical and chemical tests. The conception of latent scurvy was first emphasised by Alfred Hess (1917) of New York, who pointed out that although this condition could be diagnosed only by the response to specific therapy, yet certain symptoms might be suggestive—e.g., if children who had been fed for a considerable period on pasteurised milk, at the age of about 6–9 months suffered from loss of appetite, ceased to thrive, lost their healthy appearance, became pale, had increased knee-jerks, and possibly a rapid pulse and respiration.

ASCORBIC ACID IN URINE

A few years ago Tillmanns of Strasbourg devised a test to distinguish between lemon juice made from lemons and that produced synthetically; the fresh natural juice discharged the blue colour of 2:6-dichlorophenolindophenol whereas the artificial product did not. Later it was found that this effect was due to the presence of ascorbic acid and this test, which can be used quantitatively as well as qualitatively, has been extensively applied to the urine by Harris and his colleagues (1935) as a method of detecting latent scurvy. Although other substances present in the urine—e.g., glutathione, ergothionine, cysteine, thiosulphate—will decolorise the dye, yet in ordinary circumstances the greater part of the reducing substance present in the urine is ascorbic acid. To eliminate these interfering substances, a simple modification of the test was suggested by Prof. Haworth, depending on the fact already mentioned that small amounts of copper catalyse ascorbic acid and render it inactive. If, therefore, two separate estimations of the amount of reducing substances present in the urine are made, the one after boiling with a small amount of copper sulphate and caustic soda, the difference between the two results indicates the amount of ascorbic acid excreted. Another method is that in which the interfering substances are precipitated by mercuric acetate and then H_2S is passed through the urine to convert all the ascorbic acid to the reduced form before carrying out the titration (van Eekelen 1936).

Harris and his colleagues (1935, 1936) have made certain statements in regard to the results obtained by their test:—

1. Normal individuals appear to have a reserve supply of vitamin C, since they excrete in the urine at an almost steady rate when the supply in the diet is cut off.
2. The urine of normal adults shows an almost constant daily output of 30–33 mg. and that of the young child 1–2 mg.
3. When a large dose (100 mg. for infants) is given to a normal person there is a considerable rise in the amount excreted in the urine, because he is saturated with the vitamin and the degree of response to such a dose indicates the degree of saturation.
4. In a scorbutic patient the amount of ascorbic acid excreted is diminished and there is no increase after the test dose, but after cure or saturation of the tissues there is the same peak in the excretion as in a normal individual.

Using this test he claims to have proved the existence of many examples of latent scurvy, a condition in which the amount of ascorbic acid excreted is less than normal, and the peak after the test dose shows "unsaturation," which can be converted into "saturation" by adequate amounts of vitamin C. According to his latest figures, an adult, weighing 10 st., who excretes less than 13 mg. of ascorbic acid daily and fails to give a "good response" on the first or second day to a test dose of 700 mg. may be presumed to be taking in his diet less than the minimal requirements of vitamin C—i.e., 25 mg. of ascorbic acid or 45 c.cm. of fresh orange juice ("the greater part of the juice of a moderate sized orange.")

This test and Harris's figures have been generally accepted as the basis for determining the existence or otherwise of latent scurvy. The uniformity of daily excretion has, however, not been found by everyone. Johnson and Zilva (1934) found that there was no definite normal amount of ascorbic acid excreted in the urine daily, and that it might even reach 70–150 mg.; further, that although some were so unsaturated as to require doses of 100–150 mg. of ascorbic acid daily for a "considerable time" before saturation occurred, yet they were without any symptoms of ill health. Using the term "saturated" as meaning the more or less constant daily output of ascorbic acid in the urine after a constant daily intake of ascorbic acid, Zilva (1936) states that there is no clinical nor laboratory evidence that unsaturated persons are in a worse state of health than saturated ones. He also points out that in estimating the balance between the intake and the output of ascorbic acid the amount unaccounted for varies not only with the size of the test dose and the subject, but also at different times with the same individual on the same diet, and that there appears to be a "wide margin of 'unsaturation' which has no obvious detrimental effect on the individual." To apply to this zone of "unsaturation" such expressions as "hypovitaminosis C," "latent or potential scurvy," "vitamin C sub-nutrition," "sub-acute scurvy," expressions that imply ill-defined pathological conditions, is, in his opinion, not justified by the present state of our knowledge.

We have used the test dose method frequently in infants and children, but have given a much larger amount (500 mg.) than that suggested by Harris (100 mg.) and repeated the dose if necessary until saturation occurred. Our definition of saturation is the excretion of not less than 10 per cent. of the test dose—i.e., not less than 50 mg. Without being aware of Zilva's criticisms we had come to the conclusion that although such a test dose might be helpful in determining the presence of latent scurvy, Harris's standard for the normal excretion of the urine in infants was not always correct, and that the figures obtained for excretion alone were too variable to be of any great value (see Fig. 1). It is true that with very low excretion values, the diagnosis of latent scurvy might be accepted, but many cases that are classed as such excrete amounts of ascorbic acid which, although small, are not less than those excreted by normal children. Also, we have found that in frank scurvy the first effect of a test dose of vitamin C is to *diminish*, not to increase, the amount excreted in the urine, an observation that may be used as evidence of the presence of scurvy. Again, and bearing out Zilva's view, we have recently had a child with severe scurvy whose symptoms were

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completely cured by large doses of ascorbic acid, but who, even after considerable periods of apparently perfect health, was "unsaturated."

We cannot however, as Zilva does, dismiss the existence of latent scurvy, if for no other reason than the good effects of administering vitamin C to infants

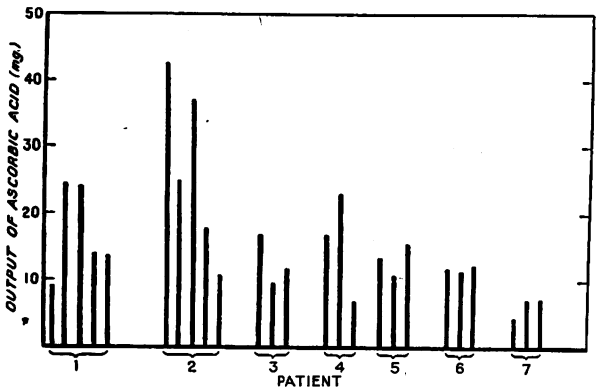

FIG. 1.—Variations in output of ascorbic acid on successive days in seven patients on an ordinary ward diet.

with vague symptoms of ill health. We therefore have come to the conclusion that the test, particularly as modified by us, does bear out the contention of Hess that there is a condition of latent scurvy analogous to latent tetany.

ASCORBIC ACID IN THE BLOOD

Ascorbic acid is present in the blood in its reduced form, but should there be hæmolysis dehydro-ascorbic acid is formed most probably by the oxyhæmoglobin set free, although after the initial hæmolysis further oxidation is prevented by the disorganised corpuscles (Kellie and Zilva 1936). Moreover the blood, like the urine, also contains other reducing substances. If therefore it is desired to obtain accurate estimations of the amount of ascorbic acid in whole blood, treatment with mercuric acetate and H_2S should be carried out (van Eekelen 1936). In serum the vitamin can be estimated (Abt, Farmer, and Epstein 1936) without these procedures, but in view of the possibility of some hæmolysis having occurred, it is also better with serum to carry out the mercuric acetate and H_2S procedure. It is possible to form an idea of the state of saturation of an individual by determining the ascorbic acid either in the urine or the blood, preferably the latter according to van Eekelen since a single examination only is needed and because the daily output in the urine varies greatly in the same person and from person to person even with about the same degree of saturation. The importance of using fasting specimens for the estimations of blood ascorbic acid has been stressed by Greenberg, Rinehart, and Phatak (1936) because they found that the level in the plasma rises from 15 per cent. to 60 per cent., 2–4½ hours after the ingestion of 6 oz. of orange juice. These workers agree, with others, that the blood ascorbic acid in the "normal" individual parallels the vitamin-C intake, and that fasting levels ranging between 0·7 and 0·9 mg. per 100 c.cm. appear to be adequate, whereas those below 0·7 are probably suboptimal and below 0·5 mg. per 100 c.cm. must be considered low.

EFFECTS OF DIET ON OUTPUT

It has been suggested that the amounts of any vitamin required depend to some extent on other factors in the dietary.

Perhaps the best known example of this is Mellanby's insistence that cereals, particularly porridge, contain something which antagonises vitamin D and which is an actively decalcifying agent and that, therefore, the child who takes any considerable quantity of cereals in the diet requires more vitamin D than the child who has only a minimal amount. The child fed on cow's milk requires more vitamin D than the ordinary breast-fed child because of the better ratio of calcium and phosphorus in breast as compared with cow's milk. It is also stated that the greater the carbohydrate content of the food in man, the greater the need for vitamin B_1. At any rate, in animals the amount of B_1 required depends upon the body-weight and the caloric intake. If large quantities of carbohydrates or alcohol are taken, therefore, the need for vitamin B_1 is increased. In a recent experiment ten patients with alcoholic polyneuritis were given one pint to one quart of pure blended whisky (caloric value 1400 to 2800) daily for from 2 to 18 weeks, with a generous diet and generous amounts of vitamin B_1, and in every case the polyneuritis was relieved (Strauss 1936).

Two papers (Ahmad 1936) have recently been published showing that vitamin-C output in the urine is increased by taking a high protein or a high fat diet. In these investigations Harris's test was used, but no attempt was made to eliminate the effect of other reducing substances in the urine. Heinemann (1936) who repeated these experiments did eliminate them and thereby found that the output of vitamin C is quite uninfluenced by the amount of protein (or fat) in the diet, but that the total reducing power of the urine did vary directly with the quantity of protein in food, and that the reducing power of the urine depended chiefly on the output of thiosulphate; he also found that cystine taken with a low protein diet had the same effect as large quantities of protein on the total reducing power of the urine, and in his opinion the sulphur-containing amino-acids are the source of the reducing body (thiosulphate) in the urine.

These results, therefore, demonstrate another fallacy that must be considered in the clinical use of the Harris-Ray test for urinary ascorbic acid.

Cataract

Another interesting clinical parallel with tetany and with scurvy has recently been traced with regard to the occurrence of cataract. It is well known that there is a form of cataract in prolonged states of hypocalcæmia; thus it has been found in association with tetany and in adults who have suffered from cœliac disease since childhood. The aqueous humour contains 20 mg. per 100 c.cm. of (reduced) ascorbic acid, about twenty times that present in the blood, and the lens itself contains even more, 30 mg. per 100 c.cm. (Campbell 1936). During the development of cataract the vitamin gradually disappears from the lens and aqueous humour and eventually is found only in the capsule. Opinions vary as to whether these changes are the cause or the result of the development of cataract. It is stated that the vitamin can diffuse from the blood into the aqueous humour and from the latter get into the lens, but that the reverse process cannot occur, and hence the vitamin content of the lens is higher than that of the aqueous humour. If anything increases the permeability of the barrier—e.g., uveitis, old age—vitamin C, which is necessary for the internal respiration of the lens, disappears from the aqueous and the lens becomes opaque. Gowland Hopkins first pointed out that the lens being separated from the blood stream can only take up the oxygen necessary for its metabolism by an oxidation-reduction system, and showed that such a system was found in glutathione, a compound which also disappears from the lens during the development of a cataract.

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According to Hopkins, these two substances—ascorbic acid and glutathione—are the most active known reducing substances in living tissue. It may be mentioned that glutathione completely protects ascorbic acid from oxidation by copper catalysis and by "hexuronic oxidase" and it has been thought that vitamin C can be derived from the reduction of sugar by glutathione (Hopkins and Morgan 1936).

Although the administration of ascorbic acid to patients suffering with cataract has not been found to have any influence on the development of the cataract, it is of interest to note that the disease is most frequent in the poorer classes whose diet is probably deficient in vitamin C.

Gastric Ulcer

Recently, Harris and his colleagues (1936) have estimated the vitamin C in the urine of voluntary hospital patients and found that amongst the lowest excretions "a quite disproportionate number were of patients with gastric and duodenal ulcer." It is not unimportant in this connexion to remember that in guinea-pigs a deficiency of vitamin C may predispose to gastric ulcer (Smith and McConkey 1933).

The most important contribution to this subject is that by Archer and Graham (1936).

At St. Bartholomew's Hospital it was found that in three-quarters of those who died of a general peritonitis after operation on the stomach the infection appeared to be due to "a bacterial leakage at the site of the anastomosis as a result of an almost complete absence of any fibrinous response along the suture line." Remembering that the wounds of patients with scurvy healed badly, it occurred to Archer and Graham that the cause of this lack of healing might be due to depletion of the ascorbic acid in the body. They therefore investigated by the Harris technique 9 patients suffering from duodenal ulcer who were taking a modified Lenhartz diet and in 6 found definite evidence of sub-scurvy.

Although the effect of scurvy in retarding the healing of wounds and ulcers renders it imperative that the diet used for gastric and duodenal ulcers should contain vitamin C in sufficient amounts to saturate the individual, the usual "ulcer diets" are quite inadequate in this respect. Two ounces of orange juice daily is sufficient to prevent the development of sub-scurvy, but Archer and Graham think it wiser to give 1000 mg. of ascorbic acid on three successive days (to ensure saturation) either by mouth or, if the patient is vomiting, intravenously, and to follow this up with two ounces of fresh orange juice daily.

Acute Rheumatism

It is well known that adults and children of the upper, and therefore presumably better fed, classes escape rheumatic infection, and the suggestion has from time to time been made that the resistance to that infection may be in part a matter of nutrition.

In 1935 Warner and Winterton investigated the diets of rheumatic children and those of adequate controls and came to the conclusion that no one factor could be incriminated as a contributory cause for the occurrence of rheumatism. They also noted that the consumption of fresh fruit and vegetables by the rheumatic families and children was much higher than that of children in poor-law schools and at Christ's Hospital, in which institutions there was a low incidence of rheumatism.

Despite these findings, it is not surprising that in this age of vitamin C, the question as to whether there is any association between vitamin C and rheumatism has been the subject of some discussion.

Rhinehart (1935), who is the chief protagonist of the view that rheumatic fever may result from the combined influence of vitamin-C deficiency and infection, infected guinea-pigs with various strains of beta streptococci and other organisms. In the presence of adequate vitamin-C nutrition rheumatic lesions were not observed, but when superimposed on vitamin-C deficiency the infection produced a valvulitis with considerable frequency, changes in the myocardium not infrequently, and subcutaneous nodules occasionally.

Sendroy and Schultz (1936) have found that patients with rheumatic fever may develop a real hypo-vitaminosis on an ordinarily adequate diet, in that 8 of 13 cases when compared with controls showed an apparent ascorbic acid deficiency. They suggest that it is much more reasonable to regard such deficiency as the result of an infectious process rather than as initiating the infection. Schultz (1936) repeated Rhinehart's experiments but considered that the lesions obtained were not similar to those found in acute rheumatism. He also found that giving ascorbic acid to rheumatic children had no effect on the incidence of recurrent attacks, nor did the administration of large doses of ascorbic acid or orange juice produce any demonstrable effect on the course of the disease. The most recent work on this subject is by Taylor (1937) who concludes that the one specific factor associated with the cardiac lesions in guinea-pigs is scurvy and that extraneous infection increases neither the incidence nor the severity of the lesion, also that "the lesions resemble those of rheumatism only in that they are both a diffuse non-purulent carditis without gross valvular vegetation."

However, Abbasy, Hill, and Harris (1936) have recently produced evidence in support of Rhinehart's claim. A group of "107 rheumatic cases" and "86 convalescent rheumatic cases" was contrasted with a control group of 64 individuals who were apyrexial, "mostly cases of congenital deformity or cases of debility well on the way to recovery," and also with another control group of "patients with surgical tuberculosis, 23 of which were called active, 19 who had improved under treatment half-active, and 46 quiescent." All these patients were on the same liberal diet containing an ample supply of vitamin C. They found that patients suffering from juvenile rheumatism, both active and convalescent, had a deficit of vitamin C in the urine, which they regard as indicating that there is an increased destruction of the vitamin in rheumatism, so that the rheumatic subject appears to have an increased need for vitamin C. These statements may or may not be true, but on the evidence produced in this paper, exactly the same deductions could be drawn for tuberculosis as for acute rheumatism. Indeed, if the results given for "active rheumatics" be compared with "active surgical tuberculosis," "convalescent rheumatics" with "half-active tuberculosis," "controls" with "quiescent tuberculosis" the curve of figures for urinary excretion is almost identical in each corresponding group. What criteria were used for determining "quiescence" I cannot say, nor can I visualise what is meant by "half-activity." It may be that a pyrexia occurs in the quiescent group and not in the others. If so, pyrexia—which, of course, may be very slight in acute and absent in convalescent rheumatism—as an expression of an infection appears to be the only common factor in the two diseases to which the diminished output of vitamin C might be attributed. In any case, I submit that the evidence Harris and his colleagues have produced directly negatives the suggestion that they imply—if they do not actually state—that vitamin C has a specific relation to rheumatism. Again the weakness of their case is shown by the fact that in contrast to the careful investigation by Schultz at the Rockefeller Institute Hospital described above, which showed the failure of ascorbic acid as a therapeutic agent in acute rheumatism, the only clinical evidence they produce in its favour is a quotation from the report of a school medical officer to an urban district council, which reads as follows: "Rheumatism is largely avoided if plenty of the citrous fruits are taken, especially if lime or lemon juice is taken in water, along with green vegetables and an increased amount of water. I find that heart trouble of rheumatic origin often disappeared by including the aforesaid in a dietary"—statements which no one with even only a nodding acquaintance with rheumatic carditis could possibly accept.

If, indeed, the rheumatic child has an increased need for vitamin C and destroys more of the vitamin

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than the normal child, then surely every case of rheumatism, active or quiescent, should show decreased excretion of ascorbic acid. Actually, we have found that the majority of a group of such children do exactly the opposite and excrete more than controls.

We examined 103 children divided into five groups in two institutions, the Children's Hospital and Moseley Hall. In the hospital, the children were arranged in three groups:—

(1) 18 who were suffering from *acute rheumatism* at the time of their admission.

(2) 12 suffering from an *acute infection* other than rheumatism.

(3) 24 *controls*, most of whom had a surgical complaint, and none of whom showed any signs of infection.

The children in these three groups were given the ordinary generous hospital diet, and those in the first and third groups did not have extra orange juice. At Moseley Hall, two groups of children both receiving the same diet were examined:—

(4) 31 *convalescent rheumatic* children; such children are transferred from the hospital to Moseley Hall when the acute phase of the disease is over, but, of course, some are subject to recurrent attacks.

(5) A control group of 18 *non-rheumatic children*, convalescent from such conditions as empyema, asthma, bronchiectasis, debility, tuberculosis, nephritis.

The urinary excretion of ascorbic acid of the children varied considerably (Fig. 1), particularly in those who had acute rheumatism, but from the graphs (Fig. 2) it is clear that the majority of the children with acute rheumatism excreted more than the "infection" control group, and that the majority of rheumatic convalescent children excreted more than the convalescent controls. With regard to saturation, 61 per cent. of the hospital non-infectious control children were saturated after the first test dose of 500 mg. of ascorbic acid and an exactly similar proportion of convalescent rheumatic children, whereas of children with acute rheumatism 50 per cent. were saturated after the first dose, practically identical with the proportion (46 per cent.) of control convalescent children.

In an attempt to assess the influence of pyrexia in rheumatism on the urinary excretion, 6 children with

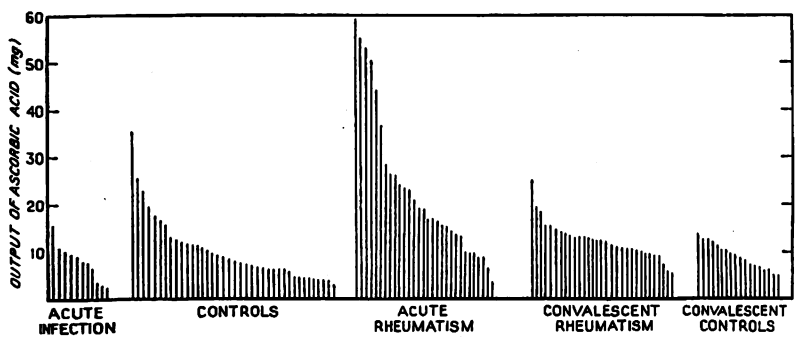

FIG. 2.—Urinary excretion of ascorbic acid showing increased output in children with acute rheumatism and during convalescence.

chorea were given an artificial pyrexia by the injection of T.A.B.; the results are variable but sometimes there was actually a slight increase (Fig. 3).

It is reasonable to assume that vitamin-C stores may be depleted by infection and such might explain Harris's finding, but it certainly will not explain an increased output of ascorbic acid. The question whether *salicylate of soda* will affect this output at once suggests itself, especially since it has been found to precipitate scurvy and death in guinea-pigs receiving diets deficient in vitamin C. Harris and his colleagues do not say whether their patients were being given salicylates, but we presume that they were; it was certainly being given to some of our patients with acute rheumatism at the time of admission to hospital and to all the convalescent rheumatic children. Another possible factor in these results is *the*

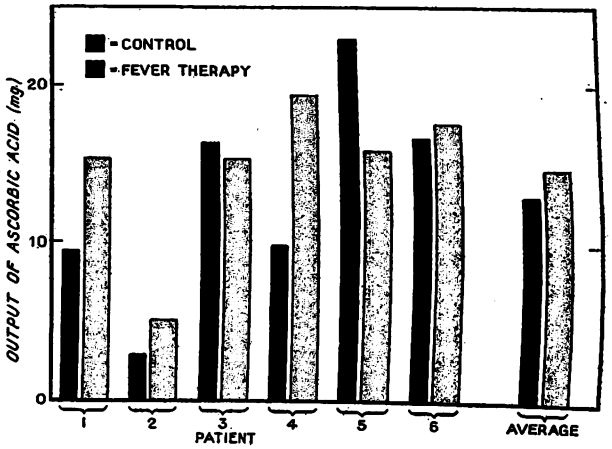

FIG. 3.—Influence of artificial pyrexia (T.A.B.) on urinary output of ascorbic acid in six children.

pH of the urine since it has been shown that the administration of bicarbonate of soda and ammonium chloride in amounts sufficient to alter the *p*H of the urine to 6·5–7·0 and 5·0 respectively produces a significant decrease in the excretion of ascorbic acid in the one case and an increase in the other. We always prescribe either the same or double the amount of bicarbonate as of salicylate of soda with the result that the urine usually has a *p*H of 7·0 whereas the rheumatism itself probably increases the total amount of acid in the urine. Recently, Daniels and Everson (1936) found that the administration of small amounts of aspirin almost doubled the excretion of ascorbic acid. We have repeated these experiments giving 50–75 grains of aspirin with double the amount of bicarbonate of soda daily, and in most instances the ascorbic acid excreted was found to be slightly increased.

The excretion of ascorbic acid in the urine, therefore, probably depends upon the sum total of the following, and possibly other, factors: the severity of the rheumatism; the amount of salicylate and bicarbonate taken; and—in view of Coombs's (1937) observations on the modification of the *p*H of the urine by simple diets—the effect of the diet. In our cases most of these factors, except the severity of rheumatism, were constant and our results may be explained by the severity of the infection and in some cases by the administration of salicylate. This explanation however cannot account for the results of Harris and his colleagues. The only conclusion therefore that we can draw is that vitamin C does not stand in any ætiological relationship to rheumatism. In spite of this conclusion, one interesting parallel between acute rheumatism and scurvy should be mentioned. The earliest pathological change in rheumatism is the swelling of collagen around small blood-vessels which

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afterwards become invaded by fibroblasts with the formation of an Aschoff's nodule, and Wolbach (1936) regards ascorbic acid as playing a late rôle in the formation of collagen. It would seem, therefore, that both scurvy and acute rheumatism are concerned with the metabolism of collagen, but whether there is any chemical difference in the two collagens I do not know.

Though I have been rather critical of the work of Harris and his colleagues, I believe that their test may be a good one and helpful provided precautions are taken, both with the test and with the interpretation of its results. It has certain fallacies—some of which we have been able to deal with; certain of the statements are incorrect, at any rate as far as children are concerned; and the deductions—some of which are probably right—have been far too sweeping and unjustified by the data.

Addison's Disease

Both the medulla and cortex of the adrenal gland have a high content of ascorbic acid and the cortex also contains "hexuronic-acid oxidase"; indeed, it was from the adrenal cortex that Szent-Györgyi originally isolated ascorbic acid. These facts, together with the possible relationship between the parathyroids and vitamin D, have given rise to speculation regarding the relation of vitamin C to Addison's disease. King (1936) maintains that the function of ascorbic acid in the adrenal is general, rather than specific, but two other suggestions as to the cause of the high content of ascorbic acid have been made: first, that it is to keep the oxidation-reduction potential in the adrenals in a correct state and by so doing to stabilise both the medullary hormone (adrenaline) and the cortical hormone (cortin); secondly, that it is to play a part in the regulation of pigmentation of the skin.

Wilkinson and Atkinson (1936) found a state of vitamin-C subnutrition in three cases of Addison's disease, the degree of subnutrition varying directly with the severity of the illness, but they do not think that it is possible to relate this vitamin-C deficiency with lack of its storage in diseased adrenals. They did not find any change in pigmentation during a test period of intensive oral therapy, although others have claimed that the pigmentation of Addison's disease has been relieved by oral and also by intramuscular ascorbic acid therapy. There is certainly an earthy tint in infantile scurvy that disappears when the child recovers, but in my opinion there is a great difference in the pigmentation of the two diseases; that of scurvy is general, whereas that of Addison's disease is greater in some sites—e.g., the flexures—than others; also the pigmentation of scurvy is very similar to that seen in some cases of acute hæmolytic anæmia and of acute osteomyelitis, which I have interpreted as indicating an affection of the bone-marrow.

So far the evidence that vitamin C can control the course or the symptoms of Addison's disease is quite unconvincing.

Dental Disease

In view of the striking oral symptoms in scurvy, the question whether deficiency of vitamin C has any effect on the structure of the teeth has attracted considerable notice. Hanke (1933) claimed that by giving one pint of orange juice and the juice of one lemon daily he was able to cure gingivitis and to arrest 50 per cent. of the caries in a group of children. In frank scurvy the supporting structures of the teeth are affected, leading to gingivitis and progressive loosening changes which, in many respects, are comparable to pyorrhœa. Experimental work on guinea-pigs can only be quoted in a general sense because their teeth differ from those of human beings in that they grow continuously. Nevertheless, experimental and pathological findings and clinical observations do suggest that during childhood, the period when growth of the body and the teeth is most active and "the susceptibility to dental disease is greatest, it is of paramount importance that the diet should include an adequate intake of this vitamin" (Pitts 1935).

Diphtheria

Recently Bamberger and Zell (1936) of Hamburg have reported that better results in children suffering from malignant diphtheria have been obtained by giving vitamin C and cortin in addition to antitoxin than with antitoxin alone. This treatment is based on the following facts: (1) in malignant diphtheria the adrenals show marked pathological changes; (2) in-vitro vitamin C inactivates diphtheria toxin; (3) in guinea-pigs the action of diphtheria toxin can be "overcome" by the administration of adrenal cortex and ascorbic acid together, whereas either alone is ineffective; (4) guinea-pigs on a diet deficient in vitamin C are much less resistant to diphtheria toxin than normal animals; and (5) the administration of vitamin C to normal guinea-pigs increases their resistance to the toxin.

Pneumonia

Pneumonia has, of course, been hailed as an illness which can be improved by administration of large amounts of ascorbic acid, a statement made because a diminished urinary output of vitamin C has been found during the period of the fever, but no relationship has been discovered between the clinical condition of the patient and the vitamin-C content of the urine.

Hæmorrhagic States

In my opinion there is no justification for associating lack of vitamin C with any hæmorrhagic conditions other than scurvy and the anæmia of scurvy. Hæmorrhage in scurvy is not due to any change in the blood, but to failure of the production of the cement substance in the capillaries, and is, therefore, in the nature of an accidental happening. Conditions such as hæmophilia, purpura rheumatica, Schönlein's purpura, thrombocytopenic purpura, myeloid leukæmia, all of which have been claimed to be benefited by the administration of vitamin C, are essentially different from scurvy in their pathology. The hæmorrhages in these diseases are for the most part due to changes in the blood, rarely to some change in the endothelium, but never to the absence of cement substance in the capillaries.

We have investigated a few cases of purpura rheumatica and in none has there been any evidence of vitamin-C deficiency; moreover, Dam (1935) and also Almquist and Stokstad (1935) have produced a disease in chickens characterised by an increased blood clotting time and scurvy-like hæmorrhages which they were unable to cure by giving vitamin C, but could cure by the administration of a fat-soluble substance occurring in pig's liver, hempseed, and certain vegetables which they call "anti-hæmorrhagic vitamin K." Further, Rusznyák (1936) in conjunction with Szent-Györgyi himself, found closely associated in the cell with vitamin C a substance labelled "vitamin P" which he claims has a definite effect in decreasing the fragility of the capillary walls in certain conditions in which ascorbic acid is inefficacious.

Certain of the hæmorrhagic disorders may therefore be due to other vitamins akin to vitamin C.

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Conclusions

From this review certain definite conclusions may be drawn:

First, the pregnant woman and nursing mother must have a generous intake of vitamin C in order that the new-born infant shall have an adequate store of vitamin C at birth and receive adequate supplies during infancy, and thereby prevent the occurrence of latent or frank scurvy.

Secondly, the artificially fed child must be given generous supplies of vitamin C.

Thirdly, an infection or pyrexia or indeed anything that considerably increases basal metabolism may either deplete the available body stores of vitamin C, or render it less potent or interfere with its absorption from the alimentary tract, possibly by the occurrence of achlorhydria or alteration of the normal *p*H of the stomach and intestines. Under such conditions more vitamin C is required, just as in pyrexia an increased intake of fluid is necessary for the increased metabolism, and in infections greater quantities of parathyroid hormone, insulin, hæmatinic factor, and iron are required. Nevertheless, there seems to be nothing to support the view that the vitamin stands in a causal relationship to any disease except the various manifestations of scurvy. There is no doubt that, as in other varieties of avitaminosis, where the intake is insufficient infection may be more likely to occur. There is, however, no justification for the administration of large amounts of this vitamin as a therapeutic or even as a prophylactic measure in every variety of infection; indeed, Wright (1936) records the development of tonsillitis, otitis media, and abscesses in patients who were completely "saturated" by daily intravenous doses of 1000 mg. of ascorbic acid for many days.

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THE EFFECT OF ŒSTROGENIC AND OTHER SEX HORMONES ON THE RESPONSE OF THE RAT TO VASOPRESSIN

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It has been shown by several workers that lesions suggestive of eclampsia (Fauvet 1931, Byrom 1937, Végh and von Pallos 1937) and of certain other vaso-renal complications of pregnancy (Byrom 1937) can be provoked in animals by repeated subcutaneous injections of the pressor hormone of the pituitary. These lesions are evidently expressions of intense vascular spasm and the parallel lends support to the prevailing view that eclampsia is an expression of vasoconstriction. The amount of vasopressin needed to cause a morbid degree of spasm is so large, however, that it is difficult to believe that eclampsia can be due, at least wholly, to over-secretion of this hormone.

The question therefore arises whether some dislocation of equilibrium arising out of pregnancy may render the vessels hypersensitive to vasopressin. In considering this possibility a promising clue seemed to be offered by the uterine muscle, the response of which to oxytocin, a hormone closely allied to vasopressin, can be greatly enhanced by œstrin (Bourne and Burn 1928) and, on the other hand, inhibited by progestin (Knaus 1929). I therefore decided to study the effect of various sex hormones on the response of the rat to vasopressin, using renal damage as a convenient yardstick.

THE EXPERIMENTS

Except where otherwise indicated the animals used have been immature unspayed female Wistar rats, from 30 to 80 g. in weight, obtained from Messrs. Glaxo Laboratories.

After treatment with sex hormone (v. infra) the rat, together with a control of the same age, is given a single large dose of vasopressin (Pitressin, Parke, Davis and Co.). To avoid leakage the rat is anæsthetised, the injection is made through shaved skin, and the puncture mark is sealed with collodion. On the following day the rat is killed and the kidneys and other organs are inspected. Histological examination is not necessary. A convenient threshold dose of vasopressin is 50 international units per 100 g. of body-weight. In the normal rat this either leaves the kidneys undamaged or, at most, causes a few blotchy areas of ischæmic degeneration in the cortex, with or without slight injection of the intermediate zone. If this is taken as a Grade I reaction, the reaction in sensitised animals may be arbitrarily divided into two further grades of severity. In Grade II the kidney displays a row of conspicuous anæmic infarcts, with broad hæmorrhagic borders, symmetrically distributed throughout the deeper layers of the cortex (see Figure). In Grade III the response is severe enough to kill the animal within a few hours, that is before definite infarcts have had time to appear. The kidneys have a soft patternless hæmolysed cut surface, and on histological examination show extreme albuminous and

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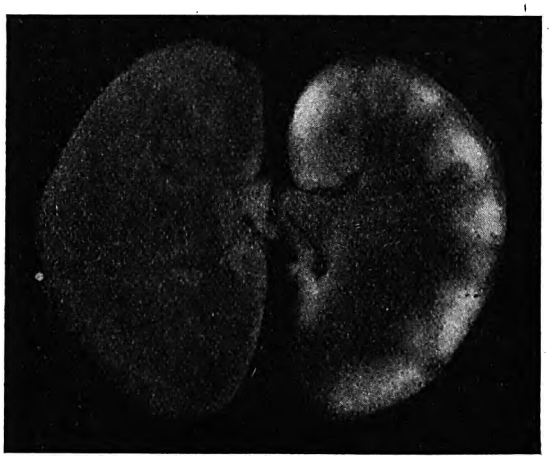
dropsical degeneration and much necrosis of tubular epithelium, while the epithelial cells lining Bowman's capsule are often enlarged to the same size as those of the subjacent convoluted tubule and show similar dropsical degeneration and necrosis. Many capsules thus contain a mass of large epithelial cells which tends to compress the glomerular tufts. In Grade III, and in the more severe examples of Grade II, the bladder contains brown altered blood and the serous cavities, especially the pleuræ, are full of straw-coloured exudate. The spleen is generally shrunken and sometimes infarcted.

RESULTS

Gonadotropic hormone.—(Aqueous solution of extract of pregnancy urine,[1] doses of 10–50 rat units twice daily over periods of two to twenty-four days.) In 20 out of 25 experiments with gonadotropic hormone the subsequent response to vasopressin was greater than that of the corresponding control. Sensitisation appears after three or four days' treatment and is generally limited in degree to Grade II, doses of 50 rat units being no more effective than doses of 10 units. Sensitisation cannot be produced in ovariectomised rats (9 out of 9 experiments). It is not modified by simultaneous treatment with progesterone in daily doses of up to 1·0 mg. (5 out of 5 experiments). It is increased by simultaneous administration of œstrin[2] (5 out of 5 experiments). These findings show that gonadotropic hormone, although predominantly luteinising in action, causes sensitisation by stimulating the ovarian secretion of œstrin.



Œstrin-sensitisation of the rat's kidney.—The kidney on the right is from an infant female rat treated with large doses of œstradiol benzoate for five days, followed by a subcutaneous injection of vasopressin (50 units per 100 g. body-weight). That on the left is from a litter-mate which was given the same dose of vasopressin, but no œstradiol. The former shows confluent infarction of the cortex. The latter appears normal.

Œstrin alone.—(Aqueous solution containing 200 international units per c.cm.[3]; oily solution of œstrone, 1 mg. per c.cm.[4]; oily solution of œstradiol benzoate, 5 mg. per c.cm.[5]; doses of from 0·01 to 0·15 mg. daily over periods of five to twelve days.) In 30 out of 32 experiments œstrin has been found to sensitise the rat to vasopressin (see Figure). The degree of sensitisation bears a more direct relationship to the dose and is, in general, greater than that caused by gonadotropic hormone. With an oily solution of œstrone containing 1 mg. per c.cm. the minimal effective dose in the intact infant rat is about 0·01–0·02 mg. per day for five or more days. In the spayed infant, which is more responsive to œstrin (18 out of 18 experiments), distinct sensitisation has been evoked with as little as 0·002 mg. œstradiol benzoate (oily solution containing 0·2 mg. per c.cm.) repeated daily for twelve days.

So far the analogy with the uterine muscle is close. It remains to determine whether progesterone is capable of preventing œstrin-sensitisation. In attempting to decide this question synthetic progesterone[6] has been given, together with or preceded by œstrone, over periods of five to fifteen days. The ratio of progesterone to œstrone has been as much as 2·5 to 0·002 mg. daily. Out of 38 experiments in which the control received equal amounts of œstrone, the response to vasopressin was unchanged in 24, greater in 11, and less in only 3 instances. Where œstrone was not given to the control group the response of the group receiving œstrone and progesterone was greater than that of the control (6 out of 6 experiments).

These results are disappointing but by no means conclusive. The response of an animal to progesterone is contingent on the presence of œstrone in proportions which can only be determined by trial and error (Robson 1937). Moreover, the rat is notoriously refractory to progesterone. Even the largest doses used failed not uncommonly to suppress the œstrous character of the vaginal smear. Further research is therefore necessary before it can be concluded that progesterone has no desensitising effect.

Male hormone (testosterone proprionate) has also been considered as a possible inhibiting agent, but a few (9) preliminary experiments suggest that, on the contrary, it tends slightly to augment œstrin-sensitisation. Given alone, in daily doses of not less than 0·1 mg. it also has a slight sensitising effect, but it is much less effective, weight for weight, in this respect than either œstrone or œstradiol benzoate.

The male infant rat responds in much the same way as the female to œstrin, gonadotropic hormone, and testosterone proprionate (9 experiments), the first mentioned being by far the best sensitising agent.

Showing the Degree of Sensitisation to Vasopressin Provoked by Œstrin Treatment

Rat	Preliminary treatment.	Dose of vasopressin (units). Per 100 g. body-weight.	Dose of vasopressin (units). Actual	Grade of renal damage (v. text).
410	Nil.	60	36	Gr. I, slight.
411	Nil.	30	20	Nil.
406	Œstrogenic hormone.	15 (1/2 & 1/4 of control)	8	Gr. II, severe.
407	Œstrogenic hormone.	10 (1/3 & 1/6 „)	6·2	„ II, mod.
408	Œstrogenic hormone.	6 (1/5 & 1/10 „)	3·2	„ I, mod.
409	Œstrogenic hormone.	4·3 (1/7 & 1/14 „)	2·1	„ I, slight.

mod. = moderate.

Rats 406–409 each received five daily doses of 0·15 mg. of œstradiol benzoate and a final injection of 50 units of aqueous theelin immediately before treatment with vasopressin. The *volume* of the vasopressin injection was the same in all experiments—i.e., 3 c.cm. per 100 g. body-weight.

[1] Antuitrin S, Parke Davis. This preparation contains neither œstrogenic hormone nor vasopressin.

[2] The term œstrin is intended to cover the common œstrogenic hormones.

[3] Theelin, Parke Davis.

[4] Menformon, Organon Laboratories Ltd.

[5] Dimenformon, Organon.

[6] Progestin, Organon, oily solutions containing 5 and 25 mg. per c.cm. I am indebted to Messrs. Organon for a generous supply of the stronger solution.

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Experiments with adult female rats have been necessarily limited by the cost of vasopressin, but the available data suggest that only gonadotropic hormone is capable of causing sensitisation. This is in keeping with the fact that the ovarian hormones have very little effect on the œstrus cycle of the adult rat.

Finally, the degree of sensitisation that can be achieved with œstrin has been roughly estimated by treating several members of a group of spayed infant rats with large doses of œstrin and then comparing the response to graded doses of vasopressin with that of the remaining unsensitised controls. The results, which are shown in the Table, indicate that a tenfold or greater increase in sensitivity can be achieved.

DISCUSSION

The main conclusion emerging from the above experiments is that it is possible to increase the sensitivity of the rat to vasopressin as much as tenfold by preliminary treatment with œstrogenic hormones, so that visible renal damage may be provoked in a rat weighing 50 g. by a single dose of as little as 2 units of vasopressin. Given such sensitisation, the possibility that natural secretion of vasopressin may reach toxic levels becomes proportionately more credible. Even so Hofbauer's (1918) pituitary hypothesis of eclampsia continues to rest solely on circumstantial evidence, and cannot be accepted as proven.

The conception of œstrin-sensitisation is nevertheless supported by evidence which, though not conclusive, is more direct. In the first place eclamptic toxæmia is peculiar to a period of pregnancy during which the secretion of œstrogenic hormone is excessive. Secondly, the incidence and severity of toxæmia and the output of œstrin both rise steadily during this period, are greatest at full term, and decline abruptly after parturition. Finally, it has been shown by Dieckmann and Michel (1937) and Schockaert and Lambillon (1937), working independently, that the eclamptic woman is hypersensitive to injected vasopressin.

There are therefore good grounds for suspecting that œstrin-sensitisation may be in some way concerned in the causation of eclampsia; but, if so, this sensitisation cannot be explained in terms of simple over-secretion of œstrin, for the normally pregnant woman, who secretes at least as much œstrin as the eclamptic (Smith and Smith 1935 a and b, 1937), is not hypersensitive but refractory to vasopressin (Schockaert and Lambillon). To reconcile this discrepancy with the idea of œstrin-sensitisation it seems necessary to postulate an additional inhibitory factor, which in normal pregnancy holds the sensitising effect of œstrin in check and which is lacking in eclampsia. The analogy of the uterine muscle points to progesterone, or some associated hormone, as a likely inhibitory factor. The present negative results do not exclude this possibility, and it may be recalled that Robson and Paterson (1937) and Young (1937) have independently and for quite different reasons suggested that progesterone deficiency may be concerned in eclampsia.

Unfortunately nothing is yet known about the secretion of progesterone in the later stages of either normal or toxæmic pregnancy, for it is not excreted, as such, in significant amounts. An excretion product of progesterone, pregnanediol, has however recently been recovered in considerable quantities from pregnancy urine (Venning and Browne 1937) and the progesterone deficiency hypothesis is not likely to remain long in doubt. Meanwhile the only practical inference that may be drawn from the present results is that they cast doubt on the wisdom of using œstrogenic hormones in the treatment of a condition which, for all that is known to the contrary, may be an outcome of relative over-secretion of œstrin.

SUMMARY

It is shown that the sensitivity of the rat to toxic doses of vasopressin can be greatly enhanced by preliminary treatment with œstrogenic hormone.

It is recalled that injections of vasopressin cause eclampsia-like lesions in animals, that the eclamptic patient is said to be hypersensitive to vasopressin, and that the period of pregnancy to which eclampsia is peculiar is characterised by a high output of œstrogenic hormone.

It is therefore suggested that œstrin-sensitisation may be in some way concerned in the genesis of eclampsia.

The expenses of this research have been defrayed by consecutive grants from the research funds of the London Hospital and the Medical Research Council. Generous contributions of hormones have also been made by Messrs. Parke Davis (Pitressin, Theelin, and Antuitrin S) and Messrs. Organon (Progestin, Menformon, and Dimenformon).

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CAVERNOUS HÆMANGIOMA OF THE ORBIT

SUCCESSFULLY REMOVED BY KRÖNLEIN'S OPERATION

By H. B. Stallard, M.D. Camb., F.R.C.S. Eng.

ASSISTANT OPHTHALMIC SURGEON TO ST. BARTHOLOMEW'S HOSPITAL; ASSISTANT SURGEON TO THE MOORFIELDS EYE HOSPITAL; OPHTHALMIC SURGEON TO MOUNT VERNON HOSPITAL

It is rarely that an opportunity arises for the successful removal of a neoplasm from the back of the orbit by a Krönlein's operation, which leaves the patient with no gross damage to vision or to important orbital structures such as the nerves supplying the extra-ocular muscles.

CASE REPORT

A sugar-factory hand, aged 36, had noticed that his right vision had been gradually failing for 9 months. He had had no pain and was in good health. There was no history of trauma.

EXAMINATION

The right vision was reduced to counting fingers at 1 metre, the right eye was displaced upwards and forwards. The pupil was equal in size to that of the left eye, it was active to light directly and consensually, and to accommodation. The movements of the globe were normal. There was papillœdema of the upper half of the optic disc and the œdema extended into the adjacent retina. The right visual field was full and the blind spot was enlarged to an extent compatible with the papillœdema

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The retinal arteries and veins were normal in size and the intra-ocular pressure was within physiological limits. The Wassermann reaction was negative; a differential blood count presented no abnormal features; and a radiogram of the orbit, accessory nasal sinuses, and skull revealed no sign of a pathological lesion. A general medical examination did not detect a primary neoplasm or other evidence of organic disease. The left vision was 6/5, the eye healthy, the visual field full, and the blind spot normal in size.

My impression was that the proptosis was due to a new formation, probably neoplastic and not inflammatory, situated within the cone formed by the recti muscles below the optic nerve and outside its sheaths, and causing mechanical compression sufficient to obstruct some of the lymphatic and venous drainage from the optic nerve and optic disc.

My reasons for believing that the neoplasm was outside the optic nerve and its sheaths were: (1) primary neoplasms of the optic nerve are slow-growing and one producing the degree of proptosis present in this patient would have caused optic atrophy and considerable visual field defects; (2) a meningioma arising from the sheath of the optic

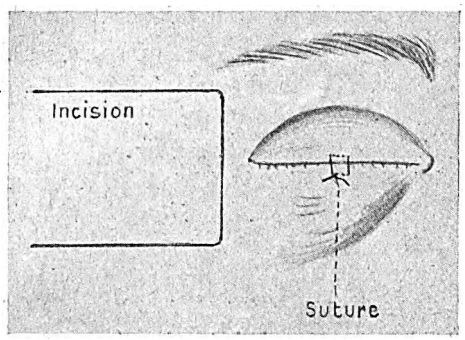

FIG. 1.—Incision for skin flap and mattress suture closing eyelids.

nerve and encircling it would on reaching the size of the neoplasm in this patient have compressed the optic nerve considerably and produced substantial loss in the peripheral visual field, and possibly disturbances in the choroidal circulation, resulting in simple retinal detachment with serous subretinal fluid and secondary glaucoma among the complications.

OPERATION

At St. Bartholomew's Hospital I performed a Krönlein's operation with the object of exploring the orbit and if possible removing the neoplasm. The lids were closed with a temporary suture, and the skin incision was made as shown in Fig. 1 and carried down to the periosteum of the external angular process, the malar bone, and the temporal fascia. Sutures were passed through the upper and lower angles of the skin flap and held up during the reflection of the flap. After this the flap was turned posteriorly over a piece of gauze, the sutures clamped to the sterile towels with Spencer Wells forceps, and the raw under-surface of the skin flap covered with gauze wrung out in warm saline. The orbital fascia and external lateral ligament were then incised close to the periosteum of the outer orbital margin and the orbital contents gently displaced medially by a flat retractor thereby exposing the lateral wall of the orbit as far as a level with the deepest part of the temporal fossa. The temporal fascia was also incised along the posterior margin of the external angular process and the frontal process of the malar bone and the temporal muscle was retracted posteriorly in order to expose the temporal aspect of the lateral wall of the orbit and the anterior part of the temporal fossa. Hæmorrhage from the skin flap and temporal muscle was checked by mosquito forceps, the larger vessels were ligatured with

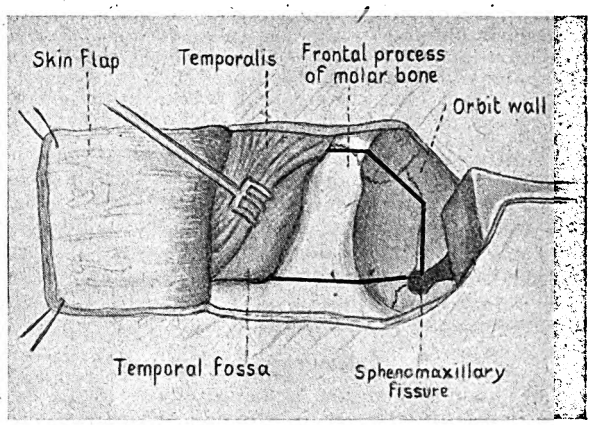

FIG. 2.—The field of operation, showing the saw cuts for the removal of a quadrilateral piece of bone from the outer wall of the orbit.

catgut, and the smaller were sealed by touching the forceps with a diathermy electrode. Retractors held the orbital contents and temporal muscle clear of the outer wall of the orbit. The periosteum was then incised and reflected for about 3 mm. over a quadrilateral shown in Fig. 2; with a small circular electrically driven saw the bone was divided along the lines of this quadrilateral, the lower cut passing posteriorly into the sphenomaxillary fissure. The outer wall of the orbit was removed and placed in normal saline at 100° F. The belly of the external rectus muscle was then divided between two mattress 000 catgut sutures. The cut ends of the muscle were reflected anteriorly and posteriorly.

The posterior part of the globe and the optic nerve were identified and the orbit was gently explored with the gloved forefinger. A neoplasm of dark purple colour, firm elastic consistence and about the size of a damson was found embracing the optic nerve below and on the nasal side. A considerable part of it was on the nasal side. Anteriorly it extended up to the sclera and posteriorly it went into the apex of the cone formed by the recti muscles. It had a thin capsule and several large vessels on its surface. The central retinal vessels could not be identified owing to orbital fat. The neoplasm was well defined and on digital examination it did not appear to be infiltrating its surrounding tissues; it was not attached to the periosteum and the medial wall of the orbit presented no gross abnormality on palpation.

By gentle dissection with the gloved forefinger the neoplasm was freed from the nasal side of the optic nerve and below. Attention was next paid to separating the neoplasm in the apex of the muscle cone, then to the

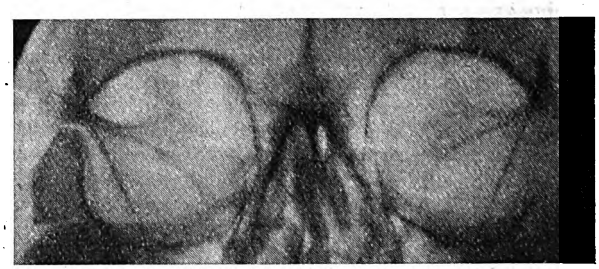

FIG. 3.—Radiogram taken one week after operation to show the position of the quadrilateral piece of bone removed from the outer wall of the right orbit.

anterior extremity and finally to the temporal side. The neoplasm was delivered by bringing it under the optic nerve and thence out of the wound. Inspection of the orbit after this procedure revealed almost the entire length of the optic nerve which appeared to be undamaged and there were no bleeding points requiring the application of pressure forceps, the cautery, or diathermy. The cut ends of the external rectus belly were sewn together with the mattress 000 catgut sutures, the quadrilateral

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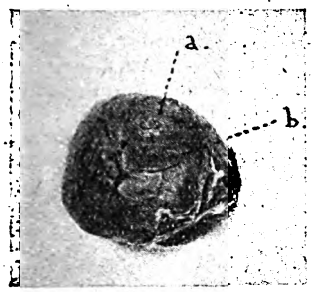

FIG. 4.—Macroscopic appearance of the upper aspect of the neoplasm. (*a*) A projection upwards on the nasal side. (*b*) Groove traversed by the optic nerve. (Natural size.)

piece of bone composing the outer wall of the orbit was replaced in position (see Fig. 3, a radiogram taken a week after operation), and the temporal muscle and orbital contents were allowed to resume their normal relationship with the outer wall of the orbit. A split rubber drainage-tube was inserted into the orbit along the angle made by the outer wall and the floor and another tube was passed subcutaneously into the lower and outer angle of the skin flap incision. The flap was carefully sewn with interrupted sutures and a firm gauze dressing applied.

PROGRESS

Three days after operation the wound was dressed and it appeared to be healing by first intention. The drainage-tubes were removed. Slight proptosis was present, the pupil was dilated, inactive to light, and slightly pear-shaped with the narrow end above. The central retinal vessels were normal in every respect. (I had feared that in removing the neoplasm some damage might have been inadvertently done to these important vessels as they could not be identified during operation.)

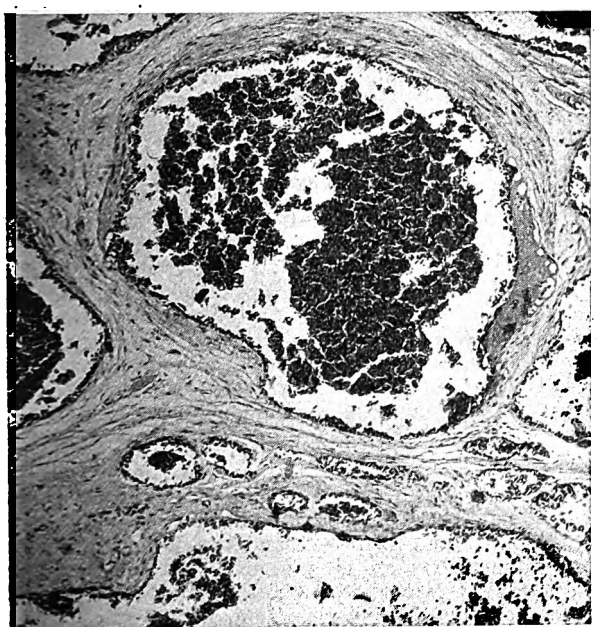

FIG. 5.—Photomicrograph showing some of the cavernous spaces filled with blood and lined by endothelial cells. The interstitial tissue is composed of fibrous and connective tissue, and some plain muscle-fibres are seen in the walls lining one of the cavernous spaces. (× 60.)

The papillœdema had subsided considerably and only a trace remained in the upper half of the optic disc. Abduction was limited. On the 5th day the pupil became active to light but remained dilated. A week after operation the patient began his visual improvement and examination on the 12th day showed no proptosis, good vertical movements, limited abduction, and to some extent impaired adduction; the pupil was smaller and active, only a slight trace of papillœdema remained, the right vision had recovered from counting fingers before operation to 6/12 (6/9 for 2 letters) with a +2·5 D. sph. and the peripheral visual field was full.

He was discharged from hospital and a month after operation Dr. W. A. Briggs sent me the following report:—"There is definite, though rather sluggish, contraction of the pupil to light, although, of course, it still remains pretty widely dilated. There is in addition an increasing amount of outward movement of the eye. The papillœdema has completely gone, though there are changes to be seen of a streaky nature in the region of the macula and extending to the top part of the disc. This probably accounts for the fact that his vision cannot be improved beyond 6/12 with a lens." On Oct. 28th, 1937, over five months after operation, Dr. Briggs reported that the vision was 6/9 (full), slight direct reaction of the pupil to light, very little outward movement of the right eye beyond the midline, but this was improving. Diplopia on looking to the right, but he was untroubled by this.

PATHOLOGICAL REPORT

The neoplasm measured 2·5 cm. anteroposteriorly, 2·1 cm. transversely, and 2·1 cm. vertically. It had the irregular shape seen in Fig. 4, was grooved by the optic nerve which passed over its upper surface, had a mulberry colour, was studded by small nodules, and had knots of deep purple tortuous blood-vessels traversing its thin fibrous tissue capsule. Its consistence was firm elastic, and on cutting into it the diagnosis of cavernous hæmangioma was confirmed. Fig. 5 is a photomicrograph of a section through part of the neoplasm. It is composed of widely dilated cavernous spaces filled with blood and lined by endothelial cells. Connective and fibrous tissues are present in the interstices, and a few of the vascular spaces have a coil of plain muscle in their wall suggesting a venous origin.

COMMENT

This case is of interest because it shows the possibility of removing a cavernous hæmangioma surgically without causing severe orbital hæmorrhage and without damage to such important structures as the central retinal vessels and the optic nerve which were in close relationship to it. It was evident that some damage had been done to the ciliary nerves thereby causing dilatation of the pupil and to the external rectus leading to some limitation of abduction. The latter is apparently a common complication after a Krönlein operation. These mishaps, however, are relatively trivial and apparently give rise to no unpleasant subjective symptoms. The visual recovery from counting fingers to 6/9, the full peripheral visual field, and the disappearance of proptosis have made the operation worth while.

I thank Dr. Briggs for his kindness in sending me this patient and for his valuable follow-up notes from time to time, and also Dr. H. F. Brewer for preparing the sections and microphotographs.

THE NORMAL LEVEL OF PLASMA BILIRUBIN*

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KNOWLEDGE of the amount of bilirubin in normal blood is at present unsatisfactory. This is in part due to the fact that many of the methods of estimating bilirubin have been unreliable and in part to the fact that no large series of values on normal healthy individuals appears to have been determined.

The object of the present investigation was, first, to determine the normal range of values in healthy

* This paper was read in the absence of the authors by Prof. Moises Chediak at the Congress of Hæmatologists, Havana, January, 1938.

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individuals using a reliable method; secondly, to assess the significance of the bilirubin level in certain anæmic states in relation to the normal values found.

METHODS

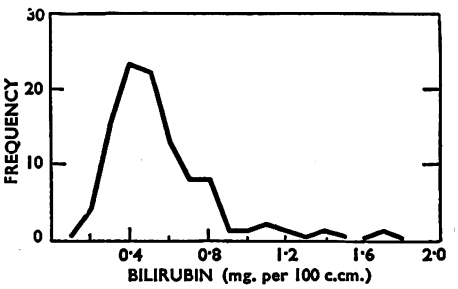
Blood was obtained by venepuncture from 50 healthy men (medical practitioners, scientific workers, and laboratory attendants) aged 16–44, and from 50 healthy women (qualified medical women and nurses) aged 20–50.

Only those samples of blood were included as normal in which the values of the red cell count and hæmoglobin estimation were within the range of normal previously indicated (Price-Jones, Vaughan, and Goddard 1935, Price-Jones et al. 1931). All samples of blood were taken between 9.30 and 10.30 A.M., the donor having had breakfast at least an hour previously.

TABLE I—PLASMA BILIRUBIN (MG./100 C.CM.)

Before breakfast.	One hour after breakfast.
1·4 .... 0·6	1·1 .... 0·5
0·5 .... 0·5	0·5 .... 0·6
1·0 .... 0·5	0·9 .... 0·6
0·5 .... 0·4	0·5 .... 0·4
1·0 .... 0·5	1·1 .... 0·4

Heparin was used throughout as an anticoagulant. Red cell counts and hæmoglobin estimations were made on venous blood by methods previously described (Price-Jones, Vaughan, and Goddard 1935). Bilirubin was estimated by the method described by Haslewood and King (1937).



Frequency distribution of plasma bilirubin in 100 healthy adults.

TABLE II—FREQUENCY DISTRIBUTION OF PLASMA BILIRUBIN

Bilirubin mg./100 c.cm.	M.	F.	Total.	Bilirubin mg./100 c.cm.	M.	F.	Total.
0·0	..	..	..	1·2	1	..	1
0·1	..	..	..	1·3	..	..	..
0·2	..	4	4	1·4	1	..	1
0·3	2	13	15	1·5	..	..	..
0·4	7	16	23	1·6	..	..	..
0·5	10	12	22	1·7	1	..	1
0·6	11	2	13	1·8	..	..	..
0·7	5	3	8	1·9	..	..	..
0·8	8	..	8	2·0	..	..	..
0·9	1	..	1				
1·0	1	..	1	Total	50	50	100
1·1	2	..	2				

M. = males; F. = females.

RESULTS

Possible effects of food intake.—In order to assess the possible effect of an ordinary breakfast consisting of bacon, eggs, toast, and coffee a series of ten estimations were made before breakfast, the last meal being dinner the night before, and an hour after breakfast. No significant difference was found (Table I). It was therefore considered justifiable to examine 100 normal subjects an hour after breakfast rather than fasting.

Normal level.—The values found in 100 healthy people for plasma bilirubin ranged between 0·2 mg. to 1·7 mg. per 100 c.cm. (Table II; and see Figure); 93 per cent. of the values were 0·2–0·8 mg./100 c.cm. All the remaining seven values were higher than 0·8 mg./100 c.cm. The high figures were all obtained in men who as far as could be ascertained were healthy and had no history of jaundice or liver disease. They had had no alcohol for the preceding 24 hours. In the two examples with highest figures estimation of bilirubin on other occasions gave figures of the same order. The values for plasma bilirubin in the 50 women cluster round the mean.

Anæmic states.—The level of plasma bilirubin found in a series of anæmic patients is shown in Table III. There were 8 cases of typical Addisonian pernicious anæmia in relapse and 1 of subacute combined system disease with megalocytic cells but an extremely mild degree of anæmia. In only 1 case was the level above the observed normal, being 2·0 mg./100 c.cm.

There were 4 cases of severe hypochromic anæmia in middle-aged women that might be described as idiopathic hypochromic anæmia; these showed figures of 0·3–0·5 mg./100 c.cm. A group of 12 cases of anæmias associated with miscellaneous conditions such as sepsis, nephritis, and hæmorrhage had values of 0·1–1·3 mg./100 c.cm.

DISCUSSION

Effect of food intake.—It has been claimed by previous observers that food intake effects the level of serum bilirubin (Perkin 1927, Barron 1931, Brøchner-Mortensen 1934–35). The level is said to be highest when fasting, protein feeding has no effect, while after carbohydrates and fat food there is a fall if a large meal is taken. The small group of results recorded here suggests that a meal of bacon, eggs, toast, butter, and coffee does not effect the level of plasma bilirubin an hour after ingestion.

Normal levels.—Previously accepted normal limits are recorded in Table IV. It is difficult to assess the value of these figures as the number of individuals investigated and their sex and age is rarely given. Individuals showing high figures were excluded in an arbitrary way by the authors as examples of "familial jaundice," a condition, however, of which no adequate description or definition has been traced. These figures cannot be excluded from the normal range without further investigation (Elton 1936, Gilbert and Lereboullet 1905, van den Bergh 1921). No evidence is given by other authors for the familial nature of the condition. The father and mother of the individual with the highest observed value in the present series had figures well within the calculated normal range. Elton (1936) claims that familial jaundice is met in approximately 3 per cent. of the white races, being especially prevalent in Jews. The bilirubin level in such individuals lies between 0·6–1·5 mg./100 c.cm. Without further knowledge of pigment metabolism in the individuals with both high and low figures it is unjustifiable to conclude that the high figures are abnormal. They may indicate, for example, a different threshold of excretion rather than of increased hæmolysis.

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The following constants can be calculated from the whole series of figures obtained in the present study :—

M (arithmetic mean) = 0·539 ± 0·02467 mg./100 c.cm.
σ (standard deviation) = 0·2467 mg./100 c.cm.
v (coefficient of variation per cent.) = 45·93 per cent.

The "skew" character of the distribution curve makes it unjustifiable to calculate the limits of normal on a basis of ±3 times the standard deviation of the mean.

It is therefore impossible with the data at present available to lay down satisfactory values for the normal limits of plasma bilirubin: 93 per cent. showed figures of 0·2–0·8 mg./100 c.cm., while the remaining 7 per cent. had values as high as 1·7 mg./100 c.cm. On the basis of these findings we would suggest that, for the present, figures between 0 and 1·3 mg./100 c.cm. should be considered as probably normal, while figures between 1·3 mg./100 c.cm. and 1·7 mg./100 c.cm. should be regarded as probably but not necessarily pathological.

TABLE III—PLASMA BILIRUBIN IN ANÆMIA

Case.	Diagnosis.	Bilirubin mg./100 c.cm.	R.B.C. mil./cm.	Hb. (per cent.).
1	Hypochromic anæmia.	0·5	4400	38
2		0·5	4800	76
3		0·3	3900	40
4		0·3	3300	36
5	Bleeding hæmorrhoids and diverticulitis.	1·3	4910	46
6	Myelo-sclerosis.	0·5	2900	49
		0·3	4200	88
		0·5		
		0·7	3700	68
7	Nephritis.	0·3	2900	54
8	Meningitis prontosil.	0·3	2800	50
9	Chronic nephritis.	0·4	1800	38
10	Uræmia.	0·5	2700	42
11	Septic leg.	0·5	3300	56
12	Arthritis.	0·3	4400	62
13	Duodenal ulcer.	0·2	3600	46
14	Pharyngeal abscess.	0·1	2410	42
15	Nephritis.	0·3	3900	62
16	Multiple injuries.	0·4	3320	54
17	Addisonian pernicious anæmia.	0·8	1700	42
18		1·0	1300	38
19		2·0	2500	58
20		1·6	1800	42
21		0·5	2840	74
22		1·0	1800	46
23 (*a*)		0·8	2030	56
23 (*b*)		0·1	1900	53
24		1·1	2100	40
25	Subacute combined system disease.	0·8	4100	92

Anæmic states.—It is often claimed that Addisonian pernicious anæmia, in contradistinction to other megalocytic hypochromic anæmias that react to liver therapy, is characterised by an abnormally high plasma bilirubin. The present figures do not substantiate this statement; 2 only of 8 patients with Addisonian anæmia showed a figure higher than 1·0 mg./100 c.cm. The group of cases is small and definite conclusions on this point cannot be drawn from the figures recorded.

The figures both for normal and abnormal bloods here recorded suggest that before any attempt is made to assess the significance of changes in the levels of serum bilirubin, studies of associated urobilin excretion should be undertaken.

TABLE IV—NORMAL BILIRUBIN

Author.	Bilirubin mg./100 c.cm. plasma or serum.	No. of examinations.
Gilbert and Herscher .. (1905)	0·25–0·357	18
*van den Bergh .. (1921)	0·08–0·24	—
Haselhorst .. (1921)	0·5	120
*Mandlebaum .. (1922)	52 % above 0·2, 48 % at or below 0·2	—
Hetenyi .. .. (1922)	1·21–2·00 <1·1 mg. >2·2 mg.†	85
Greene, Snell, and Walters .. (1925)	0·5 –2·0	—
Forster and Forstner .. (1926)	0·2 –1·0	—
Sivo .. .. (1927)	0·8 –1·1	—
Perkin .. .. (1927)	0·05–0·35	50
Barron .. .. (1931)	0·1 –0·5	—
Elton .. .. (1935)	0·0 –0·25	—
Tecon .. .. (1936)	0·0 –0·5	—

* The figures in these cases are given in "van den Bergh units" per 100 c.cm. and have been divided by 2·5 to convert them to mg./100 c.cm. It was pointed out by Hunter (1930) that van den Bergh had described his bilirubin standard as a dilution of 1 in 200,000, whereas it was in fact a dilution of 1 in 250,000 of bilirubin. This means, therefore, that the "van den Bergh units" must be divided by 2·5 and not by 2·0 for conversion to mg./100 c.cm. The factor 2·0 is nevertheless still found in some text-books.

† Not necessarily pathological.

CONCLUSION

The level of plasma bilirubin observed in 100 healthy adults varied from 0·2 to 1·7 mg./100 c.cm., 93 per cent. of values being below 0·8 mg./100 c.cm. The mean value for the whole series was 0·539 mg./100 c.cm. It is suggested that without knowledge of urobilin excretion in relation to plasma bilirubin it is impossible to assess the significance of these figures or those previously recorded.

We are indebted to the chief medical officer of the London County Council and to the physicians and surgeons of the British Postgraduate Medical School for permission to investigate patients in Hammersmith Hospital.

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THE HEART IN DIPHTHERIA *

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The prevalence of severe diphtheria in Hull during the past six years has given opportunities for the observation and study of the toxic effects seen in this disease. This paper deals particularly with the toxic myocardium—its signs and symptoms. It attempts to classify, chiefly in a clinical manner, the varying degrees of myocardial damage with a view to prognosis and management of the cases. It is based on observations from a series of 4700 cases of faucial diphtheria, which included 461 deaths, mostly toxic, and 452 non-fatal paralysed cases.

The ground is well trodden, excellent descriptions exist, and it may seem presumptuous to enter such a field armed only with fingers, stethoscope, and sphygmomanometer. But reading over the classical descriptions and watching cases in the wards, it is felt that something may still be usefully said particularly in the roughly quantitative evaluations of the cardiac signs. Is this heart condition better to-day than it was yesterday? Of what significance is this increase in the number of extrasystoles?

As bacteriological types differ, so also, and perhaps consequent thereon, clinical types differ. It is therefore unwise to regard signs observed locally as being of general application. Different rates of toxin production and fixation must produce different clinical signs, and there is a distinct impression that the toxic damage seen in Hull recently is of different type from that seen elsewhere. The Hull cases give one more the impression of heart disease, myocardial failure as such, rather than cardiac disease associated with considerable peripheral circulatory failure that had previously been noted.

The large number of toxic deaths is due chiefly to the heavy incidence of gravis strains of *Corynebacterium diphtheriæ* during this time. The majority of toxic deaths occurred within the first fifteen days of disease. In all these cases the heart is undoubtedly affected but when death occurs early, say during the first week, cardiac phenomena are not prominent and they are so overshadowed by the general poisoning that one is inclined to say that these early deaths are due to general toxæmia. Later, from the 7th to the 14th day of disease, cardiac symptoms and signs are more in evidence and the impression given is that death is due to cardiac or circulatory failure. The line between general toxic death and cardio-toxic death is arbitrary and in some cases shadowy, especially about the 7th, 8th, and 9th days, but in the majority of cases the distinction is clinically recognisable. Late cardiac deaths associated with 5th and 6th week paralyses have not been seen.

There is little to say about the acute toxic death. Cardiac signs are slight and similar to those met with in any very severe toxæmia. My chief material will be severe toxic cases which have survived the first week of illness and which either die round about the 11th day of disease or which make a slow recovery, usually complete. A few, having survived the perils of severe cardiac disease, fall victims to a late respiratory paralysis.

THE PULSE-RATE

These cardio-toxic cases, the "early heart" cases of the classical writers, show various symptoms and signs. Following a severe infection of nasopharyngeal type, with evidence of toxæmia shown by periadenitis, drowsiness, hæmorrhages, and toxic appearance, definite heart signs begin to be noticed about the 7th day. The first of these is usually in connexion with the pulse; decreasing force may be noted but the most characteristic changes are associated with rate. A high rate at first is followed by a characteristic fall. The patient may die in this bradycardiac phase but if he survives it lasts for a few days and then the rate rises again. If the pulse is charted—and it should be charted in every case of diphtheria because it gives us more information than the temperature chart—these alterations in rate give a characteristic curve. In the most severe cases one gets what might be called a Type I curve (Fig. 1). There is a considerable and rapid fall, a low bradycardiac level, and a rapid rise to a rate a little less than before the fall. In Type II both the fall and the rise are more gradual and the curve instead of following the lines of a cup as in Type I is more like that of a saucer cut in section (Fig. 2), the shallower the curve the less the significance. The heart that has escaped serious damage will not show either curve, but after an initial fall due to subsidence of fever will maintain an almost constant level.

In describing these pulse charts certain precautions are implicit. The patients are at rest in bed the whole time and the pulse is taken quietly by a competent nurse who counts for a full minute against a watch;

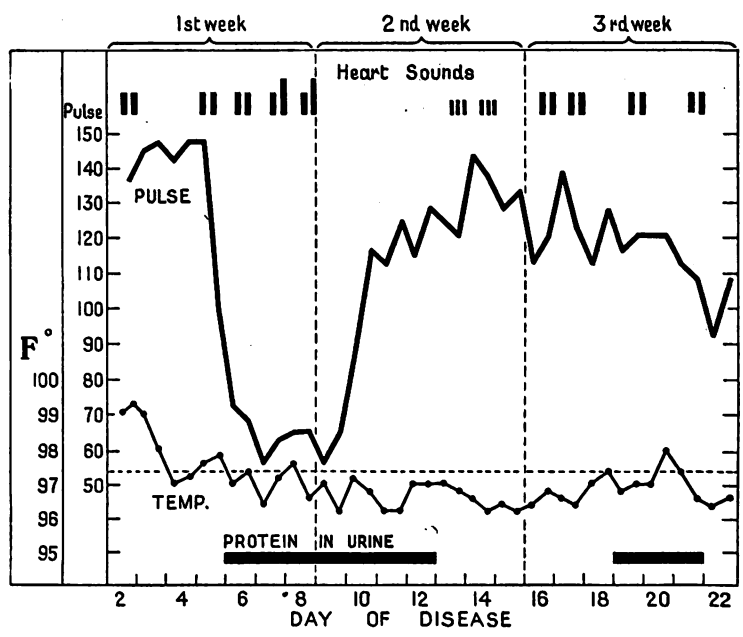

FIG. 1.—Clinical chart of girl aged 2½, with severe diphtheria and eventual recovery, showing a Type I (cup-shaped) pulse curve and alterations in heart sounds. The first and second heart sounds are represented by columns and the lengths of these show the relative loudness; the three columns together represent a reduplicated second sound causing triple rhythm.

* A paper read to a meeting of the Fever Hospital Medical Services Group of the Society of Medical Officers of Health.

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she repeats the observation if there is a considerable divergence (say more than 15 beats) from the previous reading. Subsequent pyrexia due to complications may modify the pulse curve. Pulse charts taken with these precautions are most valuable guides. An interesting feature is that these rate curves follow the blood-pressure curves. As the pulse-rate falls so does the blood pressure, and the day showing the most pronounced bradycardia is usually the day when the lowest blood-pressure readings are obtained. This, which is a reversal of the physiological rule that the lower the blood pressure falls the more rapid the pulse becomes, is both an indication and a measure of cardiac and circulatory impairment. A colleague, Dr. Robert Moyes, studied the blood pressure in 120 children at Cottingham throughout their stay in hospital and in practically all cases the blood pressure and pulse-rate curves showed correspondence. If therefore we have satisfactory pulse records we do not need the more laboriously gathered blood-pressure records; the former may be taken as a shadow of the latter (see Fig. 3).

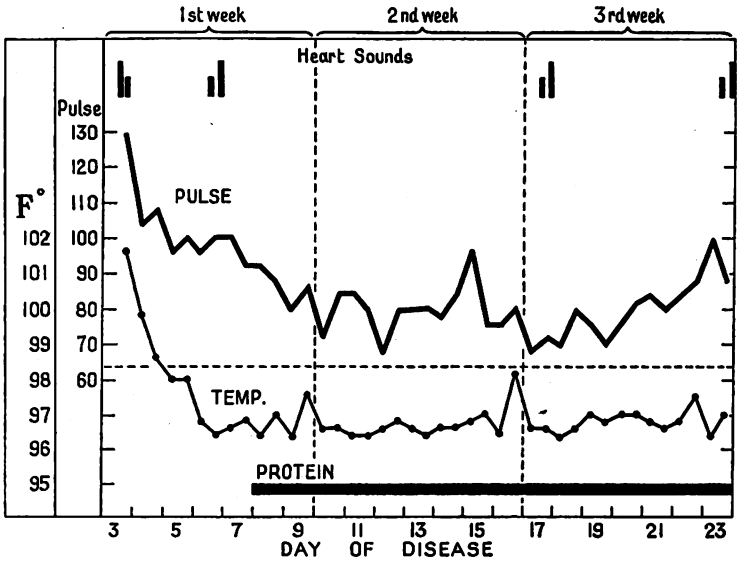

FIG. 2.—Clinical chart from boy aged 3½, with moderately severe diphtheria, showing a Type II (saucer-shaped) pulse curve and alterations in heart sounds.

Most cardio-toxic deaths take place within the bradycardiac phase. A pulse-rate of less than 50 is dangerous; of less than 40 is usually fatal. The lowest rate I have recorded is 18, felt at the wrist and heard at the apex a few hours before death. If the bradycardiac stage is passed the outlook improves with the rising rate, though a second tachycardia may be ominous if associated with other cardiac signs. A very feeble pulse, a dicrotic pulse, or a pulse imperceptible at the wrist are grave prognostic signs which need no discussion here.

THE HEART SOUNDS

If we pass from a consideration of pulse-rate curves to auscultatory signs we again can classify these in an order which indicates in the main increase or decrease in severity. Every text-book quotes the weakening of the first cardiac sound as evident in these severe cases and it is stated, and it is true, that this sound may become inaudible. Attempts have been made in the past to measure the sounds clinically and the differential stethoscope was devised for this purpose. In this instrument the sectional area of a sound-conducting channel can be varied, and in use this is decreased until the sound to be measured becomes inaudible, when the reading on a calibrated dial is made. By this means variations in the same sound from day to day may be noted or the relative intensities of the sounds in different areas compared. I have had a little experience of this instrument but discarded it for two reasons: first, I found the end-point—the point at which the sound *just* becomes inaudible—difficult to determine; and secondly, that in the diphtheritic heart some of the sounds are outside the range of the instrument—if the first sound is inaudible it obviously cannot be measured.

It appeared to be simpler and more satisfactory to compare the heart sounds at a given area with each other. The chosen area was the apex, by which is meant the visible apex pulsation, or if this is not apparent the outermost and lowest point of maximum thrust as determined first by the flat hand and then by the palpating finger. At the apex so defined if comparison is made between the relative intensity of the two sounds they may easily be classed in one of three ways. In the majority of normal hearts the first sound is greater in intensity than the second, and this is easily appreciated. In a weakening heart the first sound is weakened relatively to the second so that the intensity of the sounds approximate each other and we may say the first sound is equal to the second. Finally as myocardial weakness increases the second sound becomes relatively louder than the first. There are thus three classes, easily distinguishable after a little practice, into which we can place heart sounds at the apex: 1st > 2nd, 1st = 2nd, 2nd > 1st.

There are certain precautions to observe in using this rough clinical measurement.

Auscultation must be at the apex as defined; and it must be remembered that sometimes a normal heart may not give the usual sound ratio. In some children with apparently healthy hearts the second sound is louder than the first at the apex and in these cases the preponderance seems to be due to a relative increase of the second sound rather than to a weakening of the first. It is generally associated with an accentuated pulmonic second sound and is possibly due to abnormal sound conduction owing to anatomical peculiarities. An isolated observation, therefore, of 2nd > 1st at the apex should not be regarded as significant. It is change of these ratios in the same heart during the course of observation that is so important.

Another precaution to be borne in mind is that it is the intensity—the relative *loudness*—of the sounds we are comparing. Quality differences must be ignored. There is a tendency because of its sharp staccato quality to over-rate the intensity of the second sound.

Sometimes when differences between the sound intensities are slight, it is difficult to say which is the louder. If in doubt classify as 1st = 2nd. If it is necessary to listen for a long time then the sounds *are* approximately equal. The common normal 1st > 2nd or the abnormal 2nd > 1st are almost immediately recognisable as such.

If the sounds are equal note the length of the diastolic pause, if long these sounds are equal with normal spacing, if the pause is shortened the sounds are those usually described as tic-tac.

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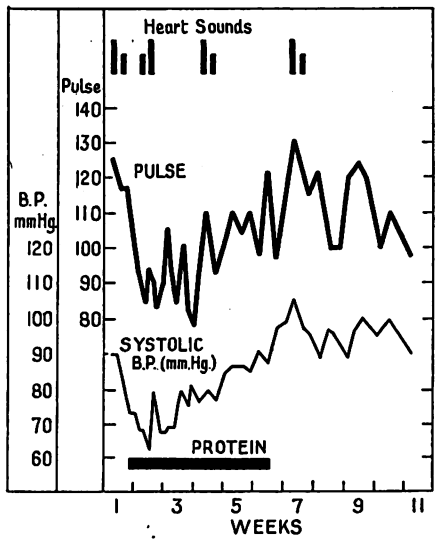

FIG. 3.—Severe diphtheria in child aged 5. Blood pressure and pulse-rate compared throughout ten weeks of illness. Note general similarity of curves, pressure rising with rate. Onset of palate paralysis in third week. Patient up in blankets in eighth week. The chart is typical of findings in severe and moderately severe diphtheria.

The heart should be examined under the conditions of absolute rest and at the same times daily. After comparing the sounds the other areas should be examined in the usual way and any abnormalities of rhythm noted, particularly the presence or absence of extrasystoles. If these are present the number per 100 beats palpable at the wrist should be noted; if the physician counts the extrasystoles by listening at the apex the nurse can count the beats at the wrist and signal when she gets to 100. If extrasystoles are less than 1 in 100 they may be described as occasional; a very usual figure is 5 or 7, but we have recorded as many as 25 or 30. Other points to listen for are splitting of the sounds, and if reduplications occur to note which sound is affected and if the reduplication is occasional, intermittent, or constant.

By using these criteria—the relative intensity of the sounds at the apex, the regularity or otherwise, the relative number of extrasystoles, and qualitative alterations in the heart sounds, particularly reduplication—we can form a scale which shows increasing or decreasing cardiac dysfunction. If a severely poisoned myocardium be observed from the day of admission the changes are fairly constant, and the average case will run somewhat as follows:—

During the first four or five days of disease the first sound is greater than the second; about the 7th or 8th day the sounds become equal, and then the second sound becomes greater than the first, then extrasystoles may appear and may increase in frequency. If the cardiac condition improves extrasystoles become fewer and disappear but the sound ratio 2nd > 1st may persist for a long time. If the condition of the heart gets worse, splitting of the second sound at the apex occurs, at first inconstant or in small groups, later constant and there is an established triple or gallop rhythm. Established gallop rhythm though of the gravest prognostic import is sometimes recovered from. In other cases the first sound is reduplicated and it would appear that triple rhythm due to a splitting of the first sound is of more serious omen than that due to reduplication of the second. Death generally occurs within a few hours.

In general therefore the auscultatory signs can be placed in a scale in the order of increasing severity somewhat as follows.

(1) Sounds, 1st > 2nd
(2) ,, 1st = 2nd } regular.
(3) ,, 2nd > 1st
(4) ,, 2nd > 1st with few extrasystoles.
(5) ,, 2nd > 1st ,, numerous extrasystoles.
(6) Intermittent reduplication of 2nd sound.
(7) Sustained reduplication of 2nd sound.
(8) Sustained reduplication of 1st sound.
(9) Inaudible 1st sound.

From any point on this scale, except possibly the last two, improvement may take place and the order of change be reversed. The scale should always be considered in conjunction with the pulse-rate curve, prognosis improving with rate except in the cases showing reduplication.

There seem to be two stages at which extrasystoles may be noted. They may occur during the second week when if numerous they indicate, in conjunction with other signs, severe myocardial damage. The second stage is from the 5th to 8th week when extrasystoles may appear and be very numerous, but their presence then is not nearly so significant and has not, in our cases, been associated with any serious cardiac phenomena.

In all these severe cases proteinuria is almost a constant accompaniment and its presence or absence should be charted regularly to assist in the general interpretation of graphical records.

PROGNOSIS

If we now combine these observations we are in a position to determine clinically the condition of the heart with a sufficient degree of accuracy to gauge progress; to give a sound prognosis; and to be a guide for general management and treatment of the case. If the statements made are substantially accurate we can say in surviving cases after three weeks' observation whether the heart is affected or not in some such manner as this.

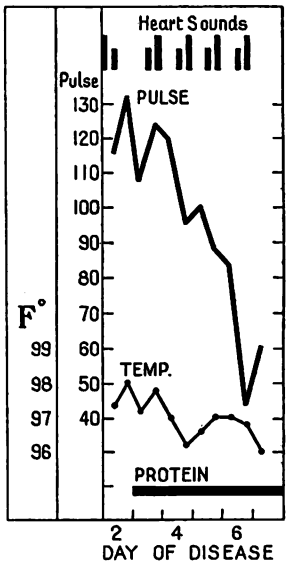

FIG. 4.—Clinical chart from a fatal case of toxic diphtheria (boy aged 12). This shows the characteristic fall of pulse-rate, and might be called the first half of a Type I pulse curve.

Myocardium not affected.—Pulse curve L-shaped or flat. Heart sounds 1st > 2nd, regular. Proteinuria absent. Such a case, even if local throat signs have been severe, has escaped toxæmia either by virtue of small amounts of natural antitoxin present in the blood or by the early intravenous administration of horse antitoxin. The patient may safely be allowed up in his fourth week and will not suffer from any late paralysis.

Myocardium slightly affected.—Pulse curve not conspicuous or shallow saucer (Type II curve as in Fig. 2). Sounds 1st = 2nd or 2nd > 1st. Proteinuria absent or limited to a few days in the second or third week. Care is needed here, rest in bed till about the sixth week and paralysis a possibility.

Myocardium severely affected.—Pulse curve deep cup (Type I as in Fig. 1). Sounds after first few days 2nd > 1st, sometimes extrasystoles. Proteinuria constant for the first two or three weeks. Prognosis depends on recovery

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of rate without reduplication, but if there is heart recovery it will be followed by severe paralyses.

Myocardium fatally affected.—Pulse curve partial Type I—fall only (as in Fig. 4). Bradycardia 40 or below. Sounds after the pulse-rate falls 2nd > 1st, perhaps numerous extrasystoles; splitting of first or second sound. Inaudibility of first sound. Heavy proteinuria. Death 6th–16th day most commonly. Occasionally the fall in pulse-rate is not seen and triple rhythm is associated with a maintained tachycardia.

The most delicate sign of toxin fixation during the first three weeks is weakening of the first sound to give an apical ratio of 1st = 2nd. The next is proteinuria about the end of the third week. Often both are found together. In the absence of both there has been no severe toxæmia.

CONCLUSIONS

It is suggested that by making use of observations such as these it is possible to plan our general management of diphtheria cases more efficiently. As a rule diphtheria cases are over-treated as regards rest. This is due to excessive caution. Severe cases will certainly need 7, 8, or even 12 weeks in bed and must have this treatment. But mild and moderate cases that have not given the indications of toxæmia specified may safely be sent home at the end of their fourth week.

With regard to treatment I have little to say; rest, absolute rest, is still all-important in the cardiotoxic cases. Whether any drug influences this condition for good is open to doubt. Adrenaline was noted in some of our earlier cases to increase the number of extrasystoles with resulting decreased cardiac efficiency. I have discontinued its use entirely. When one considers the electrocardiogram and the general indication of interference with conduction the use of the digitalis group seems to be contra-indicated.

Of other drugs, camphor, Coramine, and lately Eucortone and vitamin-C concentrates one can only say that they do not alter to any appreciable degree the clinical picture.

Survival depends upon the amount and distribution of undamaged or lesser damaged myocardial tissue and it is difficult to see how the stimulation of this modicum is helpful. Conservation should be the aim; the control of vomiting in toxic cases by glucose and insulin, and the careful use of morphine to secure the all-important rest are indirect methods of cardiac treatment that mean more for the patient in the present state of our therapeutic armamentarium than any cardiac drugs.

Some of the clinical phenomena discussed may be explained simply, but the cause of others is obscure and demands the careful comparison of clinical and electrocardiographic findings. Some work has been done in this respect with Drs. J. W. Brown and D. C. Muir, and serial electrocardiograms have been taken of two groups of cases, totalling 97, in different years. At the same time a number of post-mortems on these cases have been performed and an attempt is being made to evaluate the significance of certain of the records obtained. This work will appear later, and meanwhile the investigation continues.

I should like to express my gratitude to Dr. Robert Moyes for most valuable help and the use of his records.

ROYAL EASTERN COUNTIES' INSTITUTION FOR THE MENTALLY DEFECTIVE.—On Jan. 7th the research laboratories attached to this institution at Colchester were informally opened. Dr. L. S. Penrose is directing the work.

OUTBREAK OF ACUTE RESPIRATORY INFECTION IN A NEONATAL WARD

BY ALICE E. DICKIE, M.B. Glasg.

ASSISTANT MEDICAL OFFICER AT THE MILE END HOSPITAL, LONDON; LATE ASSISTANT MEDICAL OFFICER IN THE OBSTETRIC WARDS, HAMMERSMITH HOSPITAL

IN the month of March, 1937, an outbreak of respiratory infection occurred among the infants in a maternity ward of Hammersmith Hospital, 7 cases developing in the course of 31 days. The infection remained limited to one ward of the hospital, no case occurring among the 90 infants admitted to the three other lying-in wards during this time. The ward in question accommodates 18 mothers and babies, who remain in hospital for an average of twelve days after delivery. During this period 56 infants passed through the ward.

Staphylococcus aureus was obtained from the upper respiratory passages of every case that was investigated bacteriologically.

An isolated epidemic of this kind appears to be sufficiently rare to be worthy of record.

CLINICAL PICTURE

Two infants had been discharged from hospital before the onset of symptoms and were readmitted in a moribund state. No bacteriological investigations were made but the symptoms closely resembled those of the other cases.

The ages varied from ten to fifteen days, and 5 of the 7 infants were girls. All were well-developed healthy babies who had been born spontaneously at term, and in no case had cyanosis or signs of intracranial injury been present. The average weight was 7 lb. 6 oz., and all but one were breast-fed from birth. The Wassermann reaction of every mother was negative.

SYMPTOMS

Onset.—The incubation period appeared to be at least five days. One infant had been discharged from hospital five days before any symptom appeared, and another had been removed from the ward six days before it became ill. In 6 cases the onset was gradual, the infant at first appearing to have a slight cold. The 2 babies who had left the hospital had had these symptoms for three days before the mothers sought medical advice. In one case the symptoms came on acutely.

Nasal obstruction occurred in every case and was the first symptom to be noted in all but one. A mucopurulent secretion was present in 4 cases and a thin watery secretion in the remaining 3. Blocking of the nose led to difficulty in taking the breast, and a refusal to do so was often one of the first symptoms to be noted.

Cough was an early and constant symptom and was only absent in one case where the infection remained limited to the nasal passages. As the illness progressed the cough occurred in frequent paroxysms, causing considerable cyanosis in the severer cases.

Pyrexia was present in every case and was noted on the first day of the illness. High fever did not occur, the highest temperature recorded being 102·5°F. The duration varied from one to nine days, the average being five. It ran an irregular course and subsided by lysis.

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Cyanosis was present in 6 cases. In the 2 fatal cases it was extreme, the infants being almost "black" when admitted. In a third case a dusky colour of the face was present for three days and then only occurred after coughing. In the remaining three cases cyanosis was not a marked feature and was only noted after spasms of coughing.

Dyspnœa was severe in three cases and less so in two others. There was Cheyne-Stokes breathing in the 2 fatal cases.

Sputum.—A striking feature in three cases was the continuous expulsion, through nose and mouth, of a copious white frothy secretion. The cases presenting this symptom were all severe and 2 died. The condition was also present, to a less extent, in a milder case.

Signs in the chest.—The 2 fatal cases had signs of massive bilateral consolidation, which was confirmed post mortem in one of them. Cases 3 and 4 showed the signs of capillary bronchitis, fine râles being heard posteriorly, especially at the bases. In Cases 5 and 6 a coarser bronchitis was present, and Case 7 had no physical signs in the chest.

BACTERIOLOGY

No bacteriological examinations were made in Cases 1 and 2. The Table shows the findings in the other cases.

BACTERIOLOGICAL FINDINGS

Case.	Throat.	Nose.
3	*Staphylococcus aureus.*	
4	*S. aureus;* pneumococcus Type 3.	
5	*S. aureus;* non-hæmolytic streptococcus.	*S. aureus;* very heavy growth.
6	Ditto.	*S. aureus;* pneumococcus Group 4.
7	Non-hæmolytic streptococcus.	*S. aureus.*

Swabs were taken from the nose and from the back of the pharynx of 5 infants with the following results. A heavy growth of *S. aureus* was obtained from the nose in every case, and from the throat in every case but one. A pure growth was obtained from the nose in three cases and from the throat in one. In the remaining cultures a mixed growth was obtained, the other organism being a streptococcus in 3 cases and a pneumococcus in 2.

SEVERITY OF ILLNESS

The earliest cases were the most severe, the first two being fatal. All the remaining infants recovered. The symptoms gradually became less severe as the later cases developed, and in the last case the condition remained localised to the nasal passages. The infection subsided spontaneously 31 days after the occurrence of the first case.

The duration of the illness varied from 2 to 9 days, the average being 6 days. Death occurred on the fourth and fifth days in the two fatal cases.

TREATMENT

Prophylactic.—Certain routine procedures are carried out in the department. Any mother suffering from a cold wears a mask while feeding the baby. Mothers and babies who develop pyrexia or signs of an infective lesion are sent to the isolation department. Nurses suffering from colds or sore-throats are forbidden to attend to maternity cases until a swab from throat and nose has been examined bacteriologically. These precautions were taken as usual, and in addition the ward was closed to further admissions as soon as it was realised that the cases of infection among the infants were related to each other. All staphylococcal carriers were removed from the ward. Infants were strictly isolated upon the first sign of a cold developing.

Curative.—The child was placed in the position in which it appeared to be most comfortable—usually slightly propped up—and was kept completely at rest, not being removed from the cot for any purpose. The mother's milk was expressed and given to the infant by bottle or by spoon, according to which method caused least disturbance. Extra fluid was administered by mouth between feeds in the form of hypotonic saline. The nasal passages were kept cleared of mucus by means of a soft rubber catheter, lubricated with sterile paraffin, which was passed as often as necessary. Oxygen was given continuously by nasal catheter to all cases showing any sign of cyanosis or dyspnœa and was helpful in lessening these conditions. Where there was much secretion of mucus the infant was given a mixture containing tincture of belladonna (℥2½ every four hours); this had a beneficial effect in *two* cases. Stimulants in the form of Coramine and brandy were given to the severe cases when necessary.

INVESTIGATION OF CAUSES

Cases of staphylococcal pneumonia in adults have been found to follow influenza epidemics (Fraenkel 1904, Chickering and Park 1919, Macgregor 1936). A severe influenza epidemic occurred in London at the beginning of this year.

Swabs from the throat and nose of all members of the ward staff and from any patient who had a cold were submitted to bacteriological examination with the following results.

A growth of *S. aureus* and pneumococcus type 3 was obtained from two nurses, and a growth of *S. aureus* alone was obtained from two other nurses and one patient. The mother of Case 6 developed acute bronchitis during the puerperium, and pneumococcus Group 4 was isolated from the sputum. This organism was also present, together with *S. aureus*, in the nasal passages of her child. The mother of Case 5 developed a mild inflammation of the left breast on the ninth day of her puerperium—two days before the onset of symptoms in her child—and *S. aureus* was obtained from the milk. Johnson and Meyer (1925) and Macgregor (1936) consider that aspiration of infected milk may be a cause of pneumonia in infancy. Case 3 developed a staphylococcal follicular eruption of the face and neck a few days before the onset of respiratory symptoms, and the possibility of a blood-borne infection must be considered here.

DISCUSSION

Pneumonia in the neonatal period is described as coming on within a few hours or days of birth and running a rapid course, with little in the way of symptoms and signs. Among its predisposing causes may be prematurity, asphyxia at birth, atelectasis, intracranial injury, or congenital syphilis (Browne 1922, Cruickshank 1930, Warwick 1934, Craig 1935). Browne and Craig consider that aspiration of infected liquor amnii may be a cause of infection.

The outbreak described differs from this type of case. The infants were a little older, and the healthy babies in the ward were affected, whereas the delicate ones were not. A definite train of symptoms occurred, all the cases running a similar course.

Macgregor (1936) describes 10 cases of staphylococcal pneumonia in children, in which similar symptoms were present. Fraenkel (1904) draws attention to the profuse

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frothy sputum which frequently accompanies the condition in adults. Smith (1935) gives an account of 4 cases of pneumonia of staphylococcal origin, occurring among the infants in a maternity ward. The symptoms resembled those of the cases already referred to, but were of greater severity, all 4 cases being fatal.

Infants in the neonatal period appear to be especially susceptible to staphylococcal infections. Von Reuss (1921) states that pemphigus simplex is almost always due to this organism, and that conjunctivitis, omphalitis, and other lesions are frequently caused by it. Graham (1925) describes two cases of staphylococcal pyuria in new-born infants. Cases of enteritis at an early age have been attributed to this organism (Schabort 1906, Kermauner and Orth 1905). It is possible that the staphylococcus plays a more important part in the production of lesions of the respiratory tract in infancy than has hitherto been supposed.

Although *S. aureus* is occasionally isolated, it does not appear to be a normal inhabitant of the upper respiratory passages of the healthy infant. Swabs were taken from the nasal passages of 10 infants in another ward of the hospital, whose ages varied between two and thirteen days; 7 yielded *Staphylococcus albus*, one a mixed growth of *S. albus* and *aureus*, and two a small growth of *S. aureus*. These findings are consistent with those of Smith (1935) who, in an investigation of 16 healthy infants, obtained a scanty growth of *S. aureus* from the upper respiratory passages of 6, whereas in cultures taken from infants who were contacts of known cases of staphylococcal pneumonia, a heavy growth of this organism was obtained in 12 out of 15 cases.

The staphylococcus may have been the primary invader in the cases described, or it may have been secondary to some other organism. It was, however, the only organism that was constantly present. The source of infection is uncertain, but several staphylococcal carriers were found among nurses and patients.

SUMMARY

1. An isolated outbreak of 7 cases of respiratory infection in the neonatal period is described.

2. *Staphylococcus aureus* appeared to be the causal organism.

3. The ages of the infants varied from 10–15 days and all had been healthy at birth.

4. The incubation period was at least 5 days.

5. The chief symptoms were gradual onset, nasal obstruction, cough, fever, cyanosis, dyspnœa, and profuse frothy sputum.

6. The early cases were the most severe and the epidemic died out in 31 days.

7. Several possible sources of infection are considered.

My thanks are due to Sir Frederick Menzies, chief medical officer of health for London, and Prof. James Young, of the department of obstetrics, British Postgraduate Medical School, for permission to publish these cases, and to Dr. Alan Moncrieff and Dr. J. G. Scadding for help and advice.

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CLINICAL AND LABORATORY NOTES

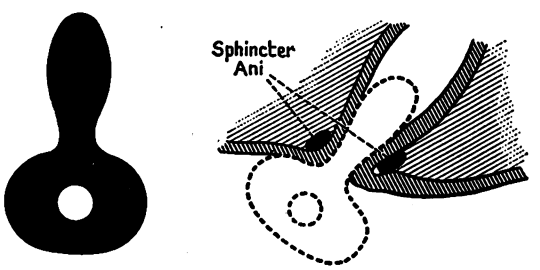
APPLICATION OF PRESSURE IN THE INJECTION TREATMENT OF HÆMORRHOIDS AND PROLAPSUS ANI

BY E. F. ST. JOHN LYBURN, M.B. Dubl.
MEDICAL OFFICER TO THE HASTINGS DISPENSARY, SUSSEX

THE amount of annoyance and distress caused by hæmorrhoids needs no emphasis from me. Their treatment by injection has without doubt been a great success, and has saved many sufferers from operation and invalidism. I wish, however, to suggest a method by which its results can be further improved.

Injection therapy, as we all know, works by sclerosis of the surrounding tissues and hæmorrhoidal sinuses, and in my experience it has been possible to enhance this effect by applying pressure over the sclerosing pile. For this purpose I use a wooden plug, made from a piece of hard wood and shaped as shown in the accompanying figure. The shape ensures that on insertion into the rectum it remains in situ, while the neck (which can be increased in diameter by a layer of gauze) comes in contact with the pile-bearing area inside the anal sphincter. This area is only a few millimetres away from the sphincter ani, which presses this pile-bearing area against the hard neck of the plug. Thus we have a pressure-removal of blood from the hæmorrhoidal area, and in fact, by the continuous action of the anal sphincter, a pressure sclerosis of the hæmorrhoids and hæmorrhoidal sinuses. We can increase the diameter of the neck of this plug to suit the tone and contraction of sphincter ani, and (what is more) we can impregnate the mucous membrane and hæmorrhoidal area by applying medicaments to the gauze round the neck of the anal plug, and thus get continuous surface therapy for as long as we wish. How different this is to the old-fashioned application of unguenta to the anus, where it only reached a part of the pile, and to the many types of suppositories, which disappear in a few minutes because of their low melting-point.

The method described thus permits of continuous application of a therapeutic agent, associated with a physical obliteration and pressure trauma to the hæmorrhoids and sinuses. Medicaments on gauze can also be applied to areas of the rectum two inches above the anal sphincter and I have found the results encouraging. The insertion of this plug with a little vaseline is painless, even after injection of the pile-bearing area.



Diagrams to show the shape of the plug and its situation when inserted.

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I have used the procedure described in very many cases of hæmorrhoids, whether prolapsed or not, with excellent results. A similar plug is even more useful in the treatment of prolapsus ani after the injection of the submucous tissues; but in these cases it must be a longer one. The levatores ani and sphincter ani combine to compress the tissues against the hard wood of the plug, which at the same time keeps the prolapsed tissues of the rectum in place until the formation of fibrous tissue holds them where nature meant them to stay. The plug in these cases is kept in position by a bandage between the legs, and the bandage is threaded through a hole in the head of the plug, as seen in the Figure. The patient is in bed, not ambulant like the patient with hæmorrhoids.

After injection of piles I advise that the plug should be kept inserted for five days, being removed only for evacuation of the bowels. For the next fortnight it is left in only at night. In cases of prolapsus ani in young children and old women rest in bed must be enforced, and the plug removed only for evacuation of the bowels. I make these patients stay in bed at least three weeks.

PNEUMO-ŒSOPHAGEAL FISTULA

BY BERYL E. BARSBY, M.B. Lond.
LATE HOUSE PHYSICIAN AT THE ROYAL FREE HOSPITAL, LONDON; AND
DOROTHY M. VAUX, M.D. Lond.
ASSISTANT LECTURER IN PATHOLOGY AT THE HOSPITAL

PNEUMO-ŒSOPHAGEAL fistula is uncommon. The case here reported is of especial interest because of the unusual type and probable site of origin of the new growth which determined the fistula.

Most of the cases on record have been in working men between the ages of 50 and 72, and the duration of life was about six months from the onset of symptoms. Gangrene of the lung was usually an early complication, but Steiner (1927) reports a case in which there was a pneumonia at the right base with no signs of gangrene for six months, although the œsophagus was perforated.

Our patient was a man of 39, a gardener, admitted to the Royal Free Hospital with pain in the right side of the chest. This had come on suddenly six months before admission, and a month later he had "belched" up blood, which gave temporary relief of pain. Three weeks before admission he had another attack of pain in the same side of the chest at the base, which was aggravated by breathing. He had a hacking cough. During this period the sputum was yellowish and extremely offensive, and he gradually developed dysphagia. From the time of onset of symptoms to the time of admission (i.e., six months) he had lost 1 st. in weight and was breathless, especially on exertion.

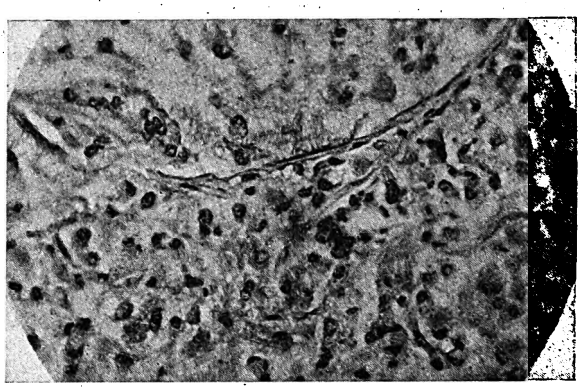

FIG. 3.—Diffuse mucoid carcinoma, showing signet-ring cells. Hæmatoxylin and mucicarmine. (× 200.)

Examination.—He was thin, sweated profusely, and had a yellowish skin, with a malar flush; there was advanced clubbing of fingers and toes, and nodules the size of a pea and of rubbery consistency were palpable under the skin of the anterior abdominal wall and over the right pectoralis major. No glands could be found in the anterior or posterior triangles. There was extreme dyspnœa and the appearance was toxæmic. Movement of the chest was diminished at the right base both anteriorly and posteriorly. Percussion was stony dull at the right base from the fourth rib down anteriorly and the sixth rib down posteriorly. Air entry was absent in this area, with decreased vocal fremitus. Ægophony was heard in the right posterior axillary line. The apex-beat was not displaced; the heart was not enlarged and there were no abnormal sounds. The sputum was offensive and contained particles of undigested food. On swallowing 2 oz. of dilute methylene-blue solution it was immediately coughed up with the sputum. Radiograms are shown in Figs. 1 and 2.

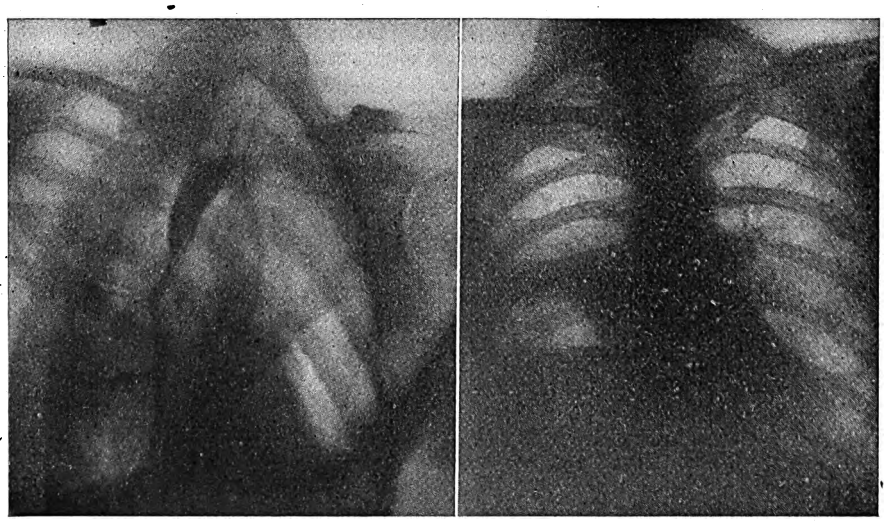

FIG. 1.—Six days before admission to hospital a barium-swallow was given and on radioscopy the fluid was seen to pass down the œsophagus into the stomach. The lower third of the œsophagus appeared constricted. A sinus at the junction of the middle and lower thirds of the œsophagus was seen to pass from the œsophagus into a cavity in the right lobe of the lung.

FIG. 2.—Radiogram taken on admission (9 days before death). The right lower lobe of the lung was converted into a large abscess cavity and contained a fluid level. It is interesting that the time interval between the two radiograms was 6 days.

Course.—Owing to the toxæmic condition of the patient and the nature of the fistula, a preliminary gastrostomy was performed with a view to drainage of the abscess later. At the operation one of the nodules was removed from the anterior abdominal wall for biopsy. It consisted of malignant epithelial cells containing mucus, the appear-

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ance being strongly suggestive of primary gastric carcinoma. The gastrostomy proved unsuccessful, and the patient died six days later.

Post-mortem examination.—The lower lobe of the right lung was converted to a ragged-walled abscess cavity

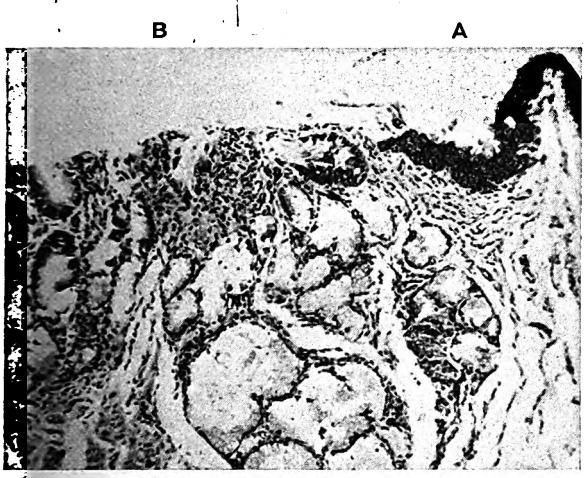

FIG. 4.—Upper cardiac glands: (A) squamous epithelium of œsophagus; (B) patch of gastric glands. Hæmatoxylin and eosin. (× 75.)

traversed by bronchi and blood-vessels and containing acid-smelling brown fluid. A large gelatinous ulcerated growth 12 cm. long occupied the whole circumference of the lower part of the œsophagus, the lower limit being 2·5 cm. above the cardiac orifice. It had begun to invade the roots of both lungs and communicated with the abscess cavity through a ragged opening in the œsophageal growth. In the upper part of the œsophagus at the level of the cricoid cartilage, on each side of the middle line anteriorly, was a linear reddish area of velvety appearance, the larger being nearly 1 cm. long. These proved to be heteroplasic patches of gastric mucous membrane.

The œsophageal, mediastinal, bronchial, cœliac, and mesenteric lymph glands were enlarged with secondary growth. Nodules of growth were present in both kidneys and both adrenals, and in the subcutaneous tissue of the anterior abdominal wall. The other organs showed little pathological change. Histologically the mucosa and whole thickness of the œsophageal wall was infiltrated by signet-ring cells, their nucleus being displaced to one side by mucus. In many areas the tumour was undergoing mucoid degeneration into a gelatinous mass (Fig. 3). The lower end of the growth was adenocarcinomatous. The secondary growths were polymorphic, containing varying amounts of mucin. The velvety patches, also the mucosa adjacent to the growth, consisted of gastric mucous membrane with glands of the cardiac and fundal type possessing chief and oxyntic cells. The limits of the patches were sharply defined from the adjacent mucous membrane (Fig 4).

The histological type of carcinoma in this case, taken in conjunction with the patch of gastric mucous membrane at the lower edge of the tumour and the patches of gastric mucous membrane in the upper part of the œsophagus, suggests that the primary growth arose in one of these heteroplasias.

In a paper on the heteromorphoses in the human body, Nicholson (1922) reviews the principal heteroplasias. He quotes Schaffer as the first to demonstrate that in about 70 per cent. of all bodies patches of gastric mucous membrane are found in the upper part of the œsophagus. These heteroplasias are termed "upper cardiac glands" to distinguish them from the lower cardiac glands which are scattered in the lower part of the wall of the œsophagus close to its opening into the stomach. Hurst and Stewart (1929) state that heterotopic gastric mucous membrane may be responsible for the initiation of peptic ulceration, and in at least three of the published cases (Fraenkel 1899, Tileston 1906, and Stewart and Hartfall 1929; all quoted by Hurst and Stewart) this association was demonstrated.

Although it is recognised that carcinoma of the œsophagus may arise in one of these heterotopic areas, few cases have been reported. Kaufmann (1929) states that "cylindrical-cell carcinomas from gland epithelium, or possibly from heterotopic gastric glands, sometimes mucoid in structure, are rare." In an analysis of 41 autopsies of carcinoma of the œsophagus, Clayton (1928) describes only 1 case, in the upper third, of an adenocarcinoma (medullary type, and no mucus-formation). He states that it arose from mucous glands in the submucosa.

Two cases (Cabot, case records, 1933, 1935) are described as adenoacanthoma. One was an extensive tumour in the lower third of the œsophagus and microscopically had the appearance of an adenocarcinoma with a little cornification. In the other case the growth was situated at the cardia and most of it was within the stomach.

We are indebted to Dr. L. S. T. Burrell for permission to publish this case.

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MEDICAL SOCIETIES

SOCIETY FOR THE STUDY OF INEBRIETY

AT a meeting of this society on Jan. 11th papers on official contacts with drug addiction were read by Dr. W. NORWOOD EAST, H.M. Commissioner of Prisons, and Major W. H. COLES, H.M. Chief Inspector under the Dangerous Drugs Act and representative of the United Kingdom on the League of Nations Opium Advisory Committee.

Drug Addiction in Britain

Dr. NORWOOD EAST began by speaking of the legislation that discourages alcoholic addiction in this country. Among the fruits of legislative action he included the State management of licensed premises at Carlisle, which owed its inception to a decision of the Central Control Board (Liquor Traffic) in 1916. The Royal Commission on Licensing reported in 1932 that the Carlisle system was likely to reduce excess while meeting the requirements of the moderate consumer and that given the right type of management it was possible to reconcile, both in intention and practice, social benefit with good business methods. During 1936 there were 47 convictions for drunkenness in Carlisle city, or 7·96 per 10,000 population, the corresponding figures for all English county boroughs being 13·07 per 10,000. The accounts for

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the year ended last March show a profit of £74,000 on a capital outlay of about £900,000. The average number of persons dealt with summarily for drunkenness, &c., in this country in the years 1910–14 was 193,354. The figure fell to 33,858 in 1932, after which there was a gradual rise to 48,110 in 1935, the last year for which figures are available. The number of persons received into prison on conviction for drunkenness was 52,149 in 1913, 5836 in 1932, and 6880 in 1935.

Turning to the arrangements made to control the manufacture, possession, and distribution of narcotic drugs, Dr. East said that the channels through which these drugs circulate legitimately are open to frequent inspection, and the addict or would-be trafficker has little chance of obtaining them from such sources without the fact of excessive supplies coming to light. There is said to be no evidence of any organised illicit traffic in drugs in the United Kingdom. The estimated population of the United Kingdom at mid-year 1936 was 47,084,753, and the approximate number of addicts known to the central office at the end of the year 1936 was 616 (313 men and 303 women). Of this total some 137 were doctors, 5 pharmacists, 3 dentists, and 2 veterinary surgeons. The drugs involved were morphine and preparations 543, heroin 61, cocaine 52, and combined drugs 50. During the year 1936 9 doctors, 1 dentist, 1 pharmacist, and 1 veterinary surgeon were convicted of offences against the Dangerous Drugs Acts.

The curative value of imprisonment for drunkenness has probably never been convincing said Dr. East. At the same time there can be no doubt that alcoholists derive benefit from even short periods of enforced abstinence. Prison medical practice has necessarily provided a large-scale experiment concerning the abrupt withdrawal of alcohol in determining the onset of delirium tremens. When cases were more numerous it was the general experience of prison medical officers that where prisoners were received verging on an attack of delirium tremens the enforced abstinence and medical care and treatment, so far from precipitating an attack, often shortened it. There is no reason to believe that this view is altered by more recent experience. In cases of addiction to narcotic drugs also, abrupt withdrawal is the practice usually adopted by prison medical officers who are in the fortunate position of having their patients entirely under control. The fact that the patient realises this and must face up to the situation has therapeutic value, and there is some reason to think that the sense of inferiority and dependence in the addict is less pronounced in the prison hospital than when at liberty, because he realises that other patients in the same hospital are often also social failures who must readjust themselves to social requirements.

International Traffic in Drugs

Major COLES said that thanks to the stricter and more general application of the international conventions there has been during the last few years a progressive shrinkage in the difference between the quantity of narcotic drugs manufactured and the quantity used for medical and scientific purposes. The statistics furnished by governments of the amounts lawfully manufactured show that these amounts approximate more and more nearly to the world's legitimate consumption, thus leaving little apparent margin available for the illicit market. It can now be said that practically no drugs that are licitly manufactured ever escape into the illicit traffic. In 1929 the known world manufacture of morphine for all purposes amounted to approximately 60 tons and the world's legitimate needs to between 31 and 32 tons, but since 1931 manufacture has approximated to legitimate requirements. There is no precise knowledge, however, of the amount consumed for maintaining addiction, nor can any accurate estimate of the number of addicts be formed. It is certain that in some countries the number is very small and in others very large. In 1930 the Canadian authorities estimated approximately 1 addict per 1000 population. The United States of America about the same time reckoned a similar figure. In 1928 it was considered that the proportion of addicts in the large towns in Germany was 1 in 10,000 and 0·56 per 10,000 elsewhere. In Egypt about 1930 it was estimated that addicts numbered 500,000 in a population of about 14,000,000. This initial figure has been much reduced in later estimates, and in 1934 the Egyptian authorities reported 18,523 addicts. In reply to a questionnaire addressed to the Chinese authorities by the League of Nations, it was stated that the number of registered opium addicts was 3,700,000. It has been stated that in Harbin there are not less than 300 heroin dens besides 100 authorised opium saloons. No one knows how many clandestine factories there are nor what is their output.

The next step in control, and it is hoped the ultimate elimination of illicit traffic, is limitation of the production of the raw materials to the quantity necessary to supply the medical needs of the world.

THE LANCET 100 YEARS AGO

January 13th, 1838, p. 561.

From a leading article on the influence of marriage on the duration of human life.

VOLTAIRE once asserted that the majority of persons who commit suicide are unmarried, and adduced this circumstance as a proof that the wedded state is favourable to the prolongation of life. HUFELAND, also, has established the influence of celibacy in rendering still more brief our sojourn upon this earth. . . .

ODIER has determined the mean duration of life in females from observations made during the years 1761 to 1813. . . . The difference of life, between married and unmarried females is, on an average, five years; or, to place the fact in a stronger point of view, a young woman of twenty years of age, by marrying, adds nine years and a half to the probable duration of her life. . . . Let us turn to the male sex, and for our personal comfort and satisfaction, show that, in giving life to others, the male also increases the probable duration of his own existence. . . . The facts . . . are clearly demonstrated by . . . tables which Dr. CASPAR has calculated from the documents furnished by DEPARCIEUX. . . . Between 30 and 45 years, a period during which men generally marry, we . . . find a difference of mortality which is considerably in favour of those who have taken unto themselves wives; after the forty-fifth year, this proportion on the side of married men goes on increasing; for the tables show us that, taking 100 married and 100 unmarried individuals, the number of those who live beyond the age of 45 is greater by 36·8 in the former class than in the latter . . . at a later period its influence becomes still more manifest, since for 11 bachelors who live beyond the age of 70 we find no less than 27 married men.

The facts . . . confirm . . . that the fulfilment of a pleasing duty, on the part of both sexes, is calculated to add many years to the probable duration of human existence.

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REVIEWS AND NOTICES OF BOOKS

British Encyclopædia of Medical Practice

Vol. VI. By Various Authors. Under the general editorship of Sir HUMPHRY ROLLESTON, Bart., G.C.V.O., K.C.B., M.D., D.Sc., Emeritus Professor of Physic, Cambridge. With the assistance of Prof. F. R. FRASER, M.D., F.R.C.P.; Prof. G. GREY TURNER, M.S., F.R.C.S.; Prof. JAMES YOUNG, D.S.O., M.D., F.R.C.S.E.; Sir LEONARD ROGERS, K.C.S.I., F.R.C.P., F.R.C.S., F.R.S.; and F. M. R. WALSHE, O.B.E., M.D., D.Sc., F.R.C.P. London: Butterworth and Co. 1937. Pp. 602. 35*s*.

THIS volume opens with an article on gonorrhœa by L. W. Harrison and ends with one on hydrotherapy by M. B. Ray. Venereology is further represented by an article by R. V. Rajam on ulcerative granuloma and physiotherapy by a contribution by E. P. Cumberbatch on radiant heat. E. A. Cockayne's article on heredity and constitution is the sole pædiatric representative in the volume which contains in all 39 articles. Of these, 22 belong to the sphere of general medicine. Three only deal with surgical topics; Norman Lake's on diseases and deformities of the hand, G. Grey Turner's on hernia, and Harold R. Drew's on hydatid disease. There are two dermatological articles; one by Arthur Whitfield on abnormalities and diseases of the hair follicles, and one on herpes by G. H. Percival. Frank Marsh discusses heat-stroke and heat-exhaustion, conditions almost remote enough from an English winter to be fairly classified, with W. G. Liston's article on guinea-worm disease and N. Hamilton Fairley's on histoplasmosis as tropical diseases. Neurology claims four articles; on hemiatrophy and hemihypertrophy by Denis Brinton, on hemiplegia by E. A. Blake Pritchard, on hydrocephalus by C. P. Symonds, and on hepato-lenticular degeneration jointly by F. M. R. Walshe and J. G. Greenfield. Of the remaining articles, 10 deal with various aspects of cardiology. D. Evan Bedford and J. W. Brown collaborate on the subject of congenital heart disease, Reginald Miller writes on rheumatic heart disease in children, and K. Shirley Smith on pericardial diseases. A. G. Gibson contributes articles on myocardial diseases and non-malignant endocarditis. Arthur W. Falconer writes on malignant endocarditis, T. F. Cotton on mitral valve diseases, Maurice Campbell on aortic valve diseases, B. T. Parsons-Smith on diseases of the right heart, and Crighton Bramwell on heart failure. The reader may feel that an undue degree of specialisation has been shown here in the parcelling out of the heart among so many authors, any one of whom could probably have coped satisfactorily with the whole subject. The rest of the volume covers ground much of which will be familiar, some less so and some but rarely explored by the general practitioner. In the first class we have D. W. Carmalt-Jones's article on hæmatemesis, Jenner Hoskin's on hæmoptysis, J. F. Gaskell's on hæmaturia, and C. P. Symonds's on headache. To the second class belong C. W. Buckley's article on gout, perhaps G. E. Beaumont's on hæmoglobinuria, and the article on Hodgkin's disease in which the general editor collaborates with M. H. Gordon and A. E. Gow. In the third group we would place the article on hæmatoporphyrinuria by E. C. Dodds and J. Douglas Robertson, hæmochromatosis by J. H. Sheldon, hæmophilia by L. S. P. Davidson, hæmorrhagic diseases by H. Letheby Tidy, and hæmothorax by F. G. Chandler. The exacting standard set by the previous volumes in this series is well maintained in this one.

Malaria

A Handbook of Treatment. Parasitology and Prevention. By BERNARD NOCHT, M.D., and MARTIN MAYER, M.D., Professors at the Institute of Tropical Medicine, Hamburg. London: John Bale Medical Publications. 1937. Pp. 196. 10*s*. 6*d*.

Two professors of the School of Tropical Medicine in Hamburg have succeeded in condensing an enormous mass of epidemiological and other data into handy compass. This alone is a feat, and the experience and distinction of the authors lend such authority to their statements that their book is likely to take a high place among works of this kind. The clinical descriptions of the more severe forms of subtertian malaria and blackwater fever are especially useful, as is also the judicious appraisement of the action of the newer drugs—atebrin and plasmoquine—in the various phases of the disease. Quinine therapy is given due prominence. The epidemiological and laboratory sections are adequate, and the section devoted to immunity in malaria is clear and satisfactory as far as our knowledge goes. At the end of the volume there are two coloured plates depicting malaria parasites in thin and thick film preparations. *Plasmodium ovale* is not featured. This is a comprehensive and up-to-date survey of malaria and many workers in tropical medicine will be glad that it is now available in English.

Fundamentals of Anatomy

By CARL C. FRANCIS, A.B., M.D., Senior Instructor, Laboratory of Anatomy, Western Reserve University, Cleveland, Ohio. London: Henry Kimpton. 1937. Pp. 320. 12*s*. 6*d*.

THOUGH the title of this book would seem to imply biological reference, the work is actually an introduction to descriptive anatomy for the student beginning his study of the body. The author has done his work well with the aid of Prof. Wingate Todd and other well-known authorities. Anatomy is approached mainly from the histological aspect and greater use of embryological detail might have been appreciated by the student anxious to understand the real structure of the parts. There are some excellent illustrations in this volume, and a good glossary and index.

The Subnormal Mind

Second edition. By CYRIL BURT, M.A., D.Sc. Oxon., Professor of Psychology, University of London. London: Humphrey Milford, Oxford University Press. 1937. Pp. 372. 10*s*. 6*d*.

THIS book has been expanded as well as revised in its second edition. Its title should not lead a new reader to expect dogmatic teaching on the recognition of mental abnormality because the distinction between the normal and the abnormal is often artificial or indefinite. There is an illuminating chapter about the normal mind, followed by others on the intellectually subnormal—the defective and the dull or backward—and the temperamentally subnormal as represented by the delinquent and the neurotic. The application of the term "subnormal" to the neurotic is somewhat unusual, but is at least partly justified by the fact that their difficulty is largely one of satisfactory adjustment to environment and so is in some sense a failure in development. When, however, the maladjustment depends more upon circumstances than upon

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personality, the term "subnormal" may be open to objection. Prof. Burt has dealt with certain of the types he describes, particularly the backward and the delinquent, in other works, and there is therefore some inevitable repetition.

The book provides a valuable introduction to a study of the mental and nervous abnormalities of both children and adults. Prof. Burt writes as a psychologist but obviously has a sound knowledge of the medical aspects of the conditions treated. He does not, like some psychologists, exclude the factor of heredity in causation. His book is based essentially upon personal experience with cases of all types, particularly among school-children, and he provides in it a basis for the comprehension of conditions which are not even yet adequately dealt with in the medical curriculum.

Synopsis of Genito-Urinary Diseases

Second edition. By AUSTIN I. DODSON, M.D., F.A.C.S., Professor of Genito-Urinary Surgery, Medical College of Virginia. London: Henry Kimpton. 1937. Pp. 294. 12*s*. 6*d*.

THE student's curriculum is now so crowded with special subjects that synopses have become almost essential to him. Genito-urinary surgery, being a specialty that has not long been established, has naturally yielded a recent crop of handbooks in which are compressed all that the student need know. In many of them an attempt has been made to cater also for the general practitioner, but Prof. Dodson has evidently not tried to do this. The fact that a great deal of space has been devoted to pathology and general urological principles, and very little to actual treatment, makes the work more suitable for the student than for the practising doctor. The illustrations, simple line drawings, are adequate if by no means elaborate.

In the new edition have been included such recent advances as the ketogenic diet and the hormonic treatment of retained testis. A discussion of neurogenic and functional disturbances of the bladder is also added to Chapter 12. The book fulfils its function in so far as it is clearly written and well arranged and illustrated.

The 1937 Year Book of Urology

By JOHN H. CUNNINGHAM, M.D., Associate in Genito-Urinary Surgery, Harvard University Post-Graduate School of Medicine. Chicago: Year Book Publishers; London: H. K. Lewis. 1937. Pp. 472. 10*s*.

THE use of year books and annuals is becoming more and more necessary to medical men who wish to keep up to date. As the editor points out in his introduction to this one, some important articles may be buried in the transactions of societies and thus missed even by industrious readers of general and special journals. It is of immense benefit to find noted and summarised within the covers of a single book everything of moment that has been written during the year.

Useful features in this particular year book are the carefully prepared index of subjects and authors and the cross references to matter in previous annuals of the series. These indices give material aid in the preparation of articles or contributions to discussions.

The most notable advances made in urology in 1937 include better methods of dealing with infection and of diagnosing and treating the more obscure cases of renal pain. Our knowledge of the pathology of prostatic enlargement and congenital abnormalities of the ureteric tract has been considerably extended, and we have acquired a more accurate realisation of the indications of transurethral surgery in cases of prostatic obstruction. These advances are set out with precision and judgment by Dr. Cunningham.

Biology for Medical Students

Second edition. By C. C. HENTSCHEL, M.Sc., Senior Lecturer in Zoology, Chelsea Polytechnic; and W. R. I. COOK, B.Sc., Ph.D., Lecturer in Botany, University College, Cardiff. London: Longmans, Green and Co. 1937. Pp. 664. 18*s*.

THE first edition of this book was written mainly for the benefit of students reading for the London First M.B. examination. Since it is anticipated that the London syllabus is shortly to be brought into line with that now adopted by Oxford and Cambridge, a new edition has been compiled which includes descriptions of some extra animal and plant types. The book covers this new syllabus very thoroughly and it would be difficult to discover any omission of facts likely to be required for examination purposes. As stated in the preface, it provides the "necessary information." It would be unfortunate, however, if medical students were to confine their biological reading to this book. It is an admirable guide to practical work but makes little attempt to point out the significance of the facts detailed in relation to general principles or to emphasise the essential unity of the biological sciences, including medicine. This surely should be the main function of a biological course in the medical curriculum, and its fulfilment depends on the proper presentation of the subject.

Medicine

Essentials for Practitioners and Students. Third edition. By G. E. BEAUMONT, D.M., F.R.C.P., Physician to the Middlesex Hospital. London: J. and A. Churchill. 1937. Pp. 780. 21*s*.

A NUMBER of additions to this book in this new edition—the third in its five years of useful life—includes much that is of practical importance as well as some rarities. It is good to find some account of the sulphonamide drugs (though the author does not seem enthusiastic about their merits), of the fuller diets now being given in cases of hæmatemesis, and of the newer insulins. Dr. Beaumont's advice on protamine insulinate differs from that given by some other workers. Dr. Joslin, for instance, who has more than 1000 patients using protamine zinc insulin, finds it adequate for over 80 per cent. of his elderly patients in Boston, but for under 20 per cent. of his young patients; whereas Dr. Beaumont regards the newer insulins as of value chiefly for young people. His opinions are sometimes expressed with diffidence, whereas in fact rather more dogmatism would doubtless be welcomed by the student in certain places. When he is told that such-and-such a treatment "may be tried" his natural question is, "Do you recommend it?" And too often there is no indication in what circumstances the answer would be "Yes." In an age sceptical of therapeutic advances it is satisfactory to note the number (over 20) of new remedies that have had to be added since the last edition of this book, among them mandelic acid, benzedrine, prostigmin, gold salts, and viper venom. The popularity of this book should be maintained by the new edition.

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THE LANCET

LONDON: SATURDAY, JANUARY 15, 1938

PREGNANCY TOXÆMIA AND THE PITUITARY

IN the days when the only pituitary preparations available for contracting the uterus were simple extracts of the posterior lobe, the obstetrician employing them sometimes encountered unpleasant or even dangerous circulatory reactions to which he gave the name "pituitrin shock." These reactions were undoubtedly caused by the pressor hormone and little has been heard of them since KAMM succeeded in separating the oxytocic and pressor components of the crude extract. The practising obstetrician will no doubt be glad enough to forget that he was ever haunted by such a spectre, but the more academically minded are still curious to know why some women should react so violently to vasopressin during pregnancy, and the phenomenon has been receiving attention in several quarters.

In Chicago DIECKMANN and MICHEL [1] have compared the effect of subcutaneous pituitrin, in doses of ½–2 minims, on the blood pressure and on water diuresis in normal pregnancy, in pre-eclamptic toxæmia, and in pregnancy complicated by nephritis. They find that the subsequent rise in blood pressure varies in normal pregnancy from 0 to 28 (average 11), in pre-eclampsia from 28 to 80 (average 51), and in nephritic pregnancy from −10 to 18 mm. Hg (average 7·7). The anti-diuretic effect of pituitrin also appears to be greater in the pre-eclamptic than in the other two groups, although here the issue is confused by the probability that any person who is becoming waterlogged would excrete only a fraction of any fluid ingested. The same question has also been studied in Louvain by SCHOCKAERT and LAMBILLON,[2] but they have used intravenous injections and they have included normal non-pregnant women in their survey. The normal woman reacts to an intravenous dose of 3 units of vasopressin by a rise in blood pressure of about 45 mm. Hg, a slowing of the pulse, and a variety of unpleasant subjective symptoms that can be ascribed to the effect of vasopressin on plain muscle in general and on the vessels in particular. In the later stages of normal pregnancy these symptoms are slight or negligible, the pressor response is less (about 25 mm. Hg), and the pulse is accelerated. In pre-eclampsia, in contrast, the blood pressure rises by about 80 mm. Hg, the pulse-rate is greatly reduced, and unpleasant symptoms are noticeable. In nephritic pregnancy, finally, the response to vasopressin is much the same as in normal pregnancy.

Evidently, then, the pre-eclamptic is peculiarly sensitive to vasopressin and it is suggested that this characteristic may be useful in diagnosis. But there has long been a suspicion that over-secretion of vasopressin may be concerned in causing eclampsia, and although any test that promises to distinguish between nephritic and toxæmic pregnancy deserves serious consideration, the risk of precipitating convulsions must be borne in mind. Both the American and the Belgian investigators are evidently alive to the possible dangers of the test and intravenous injection of vasopressin is not likely to appeal to the conservative clinician. Nevertheless it is of no small interest to learn that the eclamptic is hypersensitive to vasopressin. The experiments described elsewhere in this issue by Dr. F. B. BYROM suggest that this sensitisation may be related to the increased secretion of œstrogenic hormone which is characteristic of the period of pregnancy to which eclampsia is confined. BYROM points out, however, that to reconcile eclampsia with œstrin-sensitisation it is necessary to invoke an additional desensitising factor which is present in normal pregnancy and lacking in eclampsia. His work has not yet reached a stage at which it is possible to say whether this presumed missing factor is or is not progesterone, but the clue is a promising one.

HÆMATOMA OF THE RECTUS ABDOMINIS

THE surgeon no longer considers the abdominal wall merely as a barrier which he must circumvent or break through in order to reach the viscera behind it; he recognises it as a region of the body which has its own special problems of anatomy and pathology. A study of the rectus abdominis muscle by CULLEN and BRÖDEL [1] is therefore to be welcomed as an interesting contribution to abdominal surgery. Their paper begins with a detailed but clear review of the anatomy of the rectus with particular reference to its blood-supply. The lower two-thirds of the muscle is supplied by the inferior epigastric artery, which for the most part lies on its posterior surface, not embedded in the muscle, and below the semilunar fold of Douglas is in direct contact with the peritoneum. The whole vascular system is so arranged as to allow the greatest freedom of movement to the muscle, with the least risk of tearing the vessels, and this is particularly necessary in the rectus because of its length.

Hæmatoma is the lesion which has chiefly concerned CULLEN and BRÖDEL, the reason being that it may closely simulate intra-abdominal conditions, especially when it occurs (as it usually does) in the lower part of the muscle where it is next to the peritoneum. The hæmatoma is produced either by a tearing of the muscle itself or of the blood-vessels alone. Direct violence is not the most common cause; as a rule the patient is suffering from some debilitating disease, and a

[1] Dieckmann, W. J., and Michel, H. L., *Amer. J. Obstet. Gynec.* 1937, 33, 131.
[2] Schockaert, A., and Lambillon, J., *Brux. méd.* 1937, 41, 1468.

[1] Cullen, T. S., and Brödel, M., *Bull. Johns Hopk. Hosp.* November, 1937, p. 295.

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sudden muscular exertion such as coughing ruptures the muscle; sometimes the symptoms come on insidiously. Heart failure and pregnancy are two important general causes, while typhoid fever and influenza may both weaken the muscle locally by producing the hyaline degeneration that is associated with the name of ZENKER. Diagnosis is often difficult, especially when there is no history of trauma or of a sudden onset of the symptoms, and some cause of local peritonitis such as appendicitis or cholecystitis is usually suspected. There is also another class of case in which hæmatoma may be found and in which a special diagnostic difficulty may arise. A local predisposing cause of hæmatoma of the rectus is a previous operation through it or near it, which by setting up adhesions interferes with the mechanism by which the muscle is allowed to move independently of the vessels; in this way a sudden contraction of the muscle may produce a shearing stress which will tear the adherent vessel. A tense, tender, irreducible lump appears in the region of the old scar, and the picture of strangulated incisional hernia is fairly complete.

If the diagnosis of hæmatoma of the rectus can be made with confidence no operative treatment is advisable provided the bleeding has stopped. Usually, however, the diagnosis is established only when the lesion is exposed, and in these cases the clot should be turned out, the bleeding vessels ligatured, and the torn muscle repaired. Rarely, in cases of typhoid and influenza, the hæmatoma becomes infected by the specific organism and the sequel is an abscess.

B.B.S. AND DISEASE

OF late years increasing attention has been paid to the bisulphite-binding substances (B.B.S.) of the blood in relation to vitamin-B_1 deficiency and other conditions encountered in clinical medicine. So far as vitamin B_1 is concerned the experimental foundation for this work was laid in observations in the department of biochemistry at Oxford, the details of which appeared in a lecture by Prof. R. A. PETERS, F.R.S., published in this journal.[1] It suffices now to say that PETERS and H. M. SINCLAIR, and R. H. S. THOMPSON gave proof by in-vitro respiration studies with the brains of pigeons that in vitamin-B_1 deficiency there is a specific accumulation of the intermediary carbohydrate metabolite pyruvic acid ($CH_3CO.COOH$), whereas in the presence of this vitamin pyruvic acid does not accumulate. The implication of this work is that pyruvic acid is a normal stage in oxidation of carbohydrate which accumulates because, in the absence of vitamin B_1, further oxidation cannot take place. Developing this story THOMPSON and R. E. JOHNSON found that in animals suffering from vitamin-B_1 deficiency pyruvic acid collects abnormally in the blood, disappearing upon cure of the animal. It should be mentioned, however, that there is no evidence that pyruvic acid under these conditions is actually toxic. Its presence can be demonstrated as an increase in the value of B.B.S. in the blood, and though the property of binding bisulphite is shared with other ketonic and aldehyde substances, there is a clear proof that in the case of vitamin-B_1 deficiency it is actually pyruvic acid that accumulates. The work mentioned shares its place with other observations upon substances of this type; for instance, PI SUÑER [2] has found pyruvic acid together with methyl glyoxal in certain urines, notably those of diabetics. Further, as PETERS pointed out, A. GEIGER and colleagues have claimed the presence of methyl glyoxal in the urines of infants suffering from vitamin-B_1 deficiency.

Clinical observation in this country led to no finding of increased B.B.S. in the blood except in cases of diabetes where increases might be expected to be due to aceto-acetic acid.[1] But in the Orient, at Shanghai, in excellent work now unfortunately suspended, PLATT and LU [3] obtained evidence in some detail that the results of the animal experiments were applicable to beri-beri in man. They believed, however, that substances other than pyruvic acid, which were estimated by the B.B.S. method, were also increased in the blood, and SHINDO [4] claims the identification of acetaldehyde in the blood of beri-beri patients. Quite recently TAYLOR, WEISS, and WILKINS [5] have reported upon the examination of the bloods of a variety of clinical conditions. Finding that the normal range for B.B.S. is $4{\cdot}7 \pm 1{\cdot}0$ mg. per 100 c.cm. of blood (calculated as pyruvic acid), they consider that all cases showing 6 mg.+ per 100 c.cm. blood can be deemed to have a raised B.B.S. value. According to this criterion, raised B.B.S. were found in 10 out of 19 cases of uncompensated organic heart disease, 18 out of 23 cases of untreated vitamin-B_1 deficiency, 6 out of 9 cases of infectious disease, 7 out of 7 cases of diabetes with acidosis, and 2 out of 4 cases of nephrosclerosis. Treatment of the heart disease led to improvement in the B.B.S., and treatment of the vitamin-B_1 deficiency consistently reduced it. Of substances at present known the most likely to bind bisulphite are acetone and aceto-acetic acid, and in the diabetics there was evidence that the increased B.B.S. value was due largely to these, though pyruvic acid was also demonstrated in the urine in confirmation of PI SUÑER and FARRÁN; it was the investigators' view that the increased B.B.S. was an accurate index of the clinical severity of the diabetes. In heart disease, the raised B.B.S. value was often not due to the ketosis alone. WILSON and GHOSH,[6] in a paper inspired by the work of PLATT and LU, find that B.B.S. is increased in India in epidemic dropsy, anæmia, and splenomegaly as well as diabetes; the greatest increase (up to 8 mg.) was in epidemic dropsy.

It is clear, as TAYLOR and his colleagues say,

[1] Peters, R. A., *Lancet*, 1936, 1, 1161.

[2] Pi Suñer, A., and Farrán, M., *C.R. Soc. Biol. Paris*, 1936, 122, 859.

[3] Platt, B. S., and Lu, G. D., *Quart. J. Med.* 1936, n.s. 5, 355.

[4] Shindo, T., *Hoppe-Seyl. Z.* 1937, 247, iii.

[5] Taylor, F. H. L., Weiss, S., and Wilkins, R. W., *J. clin. Invest.* November, 1937, p. 833.

[6] Wilson, H. E. C., and Ghosh, B. K., *Indian med. Gaz.* 1937, 72, 147.

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that the increase in B.B.S. cannot be used by itself as a diagnostic test of any one disease. Nevertheless, when combined with attempts to define chemically the substances present, it may throw light upon certain aspects of disordered function. PLATT has already shown its value as an indication of the action of vitamin B_1 in beri-beri.

TUBERCULOUS MENINGITIS

THE pathogenesis of tuberculous meningitis continues to inspire both speculation and research. In 1935 we reviewed [1] it in the light of much work published in the two previous years, especially on the relation of tuberculous meningitis to miliary tuberculosis, and on the possibility of recovery. We drew attention to the difficulty of making a certain diagnosis of meningitis during life, and suggested that the accepted interpretation of changes in the cerebro-spinal fluid might require reconsideration. At that time the old view that tuberculous meningitis is the immediate and typical result of miliary tuberculosis had been severely shaken by the work of RICH and MCCORDOCK, who maintained that meningitis never follows directly from miliary tuberculosis but is always preceded by the formation of caseous tuberculomata in the brain or meninges. Some of the communications that we quoted, especially one by MORRIS SIEGEL, seemed to support this hypothesis, as does the consistent failure of animal experiment to produce meningitis by inoculation of tubercle bacilli into the blood stream. During the past two years further attempts have been made to arrive at the facts, but the results have been by no means uniform. The evidence that A. B. RAGINS obtained from examination of 47 brains did not bear out the opinions of RICH and MCCORDOCK, but pointed to a direct hæmatogenous spread (in 38 of the 47). C. RADMANN, working on a much smaller material, concluded that meningitis occurs both with and without the previous formation of solitary tubercles.

Stimulated by this divergence of opinion on a somewhat fundamental question, Dr. A. R. MACGREGOR and Dr. C. A. GREEN [2] of Edinburgh set themselves the task of answering it by a comprehensive study of 112 brains. They argued that if RICH and MCCORDOCK'S conception holds good, even in a proportion of cases, some victims of tuberculous meningitis must have had an infection of the brain with focal deposits at some previous time. It was therefore desirable to examine brains of sufferers not only from meningitis but from tuberculosis of other organs. When possible the spinal cords were also examined, and the cerebro-spinal fluid was investigated for bacilli. A search for tubercle bacilli was also made in the fluids of 45 patients with suggestive symptoms who did not die of meningitis. The report shows that of the 88 brains examined in which meningitis was present tuberculous infection antecedent to the meningitis was found in 74; and in 4 others there was disease of the spine. Thus in 88 per cent. there was evidence of old foci in or adjacent to the central nervous system. It is of interest that while foci were found in the meninges alone, in the brain alone, and in both together, the first showed the greatest number. Though there remain 10 cases in which careful examination revealed no antecedent focus, the conclusion may be drawn that tuberculous meningitis is most often preceded by a localised infection. The presence of a focus, however, does not prove that it was the source of the meningitis, and MACGREGOR and GREEN accordingly sought confirmation by histological examination of each specimen, accepting as probable sources only those foci that were not encapsuled, were adjacent to the meningeal surface, and were surrounded by recent exudate. By these criteria 10 of the 78 cases were rejected, 58 were regarded as certain, and 6 as very probable. From their histological observations the investigators are convinced that meningitis does not *arise* at the base of the brain, where it is most typically found in well-developed cases. The distribution of the exudate depends in the first instance on the situation of the initial lesion, though later it is concentrated in the basal cisterns.

While the great majority of specimens examined by MACGREGOR and GREEN supported RICH and MCCORDOCK'S view, there were 23 that did not. Further consideration made it clear, however, that neither did they support the hypothesis of hæmatogenous spread; for in 8 of them miliary tuberculosis was absent and in 7 it was very slight. Of the 25 brains that did not show meningitis 11 contained tuberculous lesions: these subjects were mostly children; miliary tubercle was severe in 7 of them and was confined to the nervous system in 3. The cerebro-spinal fluid (usually obtained post mortem by cisternal puncture) was examined in 20 cases of this group, and tubercle bacilli were demonstrated in 10. It is to be noted that bacilli were found in the fluid of 2 subjects whose brains showed no tuberculous lesion. Besides these post-mortem examinations an investigation was made of the cerebro-spinal fluid of 45 patients, 9 suffering from active tuberculosis and the rest reacting to tuberculin. None of them died or developed meningitis; in all of them lumbar puncture was performed because of symptoms of meningeal irritation. In 3 of them tubercle bacilli were recovered by animal inoculation and in 2 others the cytological changes suggested meningitis. MACGREGOR and GREEN'S explanation is that the lumbar punctures and the symptoms occasioning them coincided with the formation of tuberculous foci in the nervous system. While the result of their work leads the Edinburgh workers to support the view of RICH and MCCORDOCK they recognise that this does not account for the close association found between miliary tuberculosis and tuberculous meningitis. The possible ways by which this difficulty may be overcome are shrewdly discussed, and alternative explanations are submitted. Perhaps the most interesting and most novel of these is that the meningitis may at times give rise to the miliary tubercles.

[1] *Lancet*, 1935, 2, 950.
[2] *J. Path. Bact.* November, 1937, p. 613.

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ANNOTATIONS

RAW APPLE DIET AND INFANTILE DIARRHŒA

EVER since Moro and Heisler popularised the old-fashioned South German remedy of raw apples for diarrhœa, workers in different parts of the world have been trying it with varying success. In an Australian discussion[1] Dr. P. A. Earnshaw of Brisbane shows himself an enthusiast for the method, and what makes his results particularly important is the fact that he has had great success with young babies. Older children are apt to respond to several forms of treatment, but anything that would give uniformly satisfactory results in infancy would be very welcome. Earnshaw uses a specially prepared apple powder made from desiccated apples: two level teaspoonfuls are mixed with an equal amount of cold boiled water to make a paste, and the paste is then added to 4 oz. of hot weak tea and stirred for ten minutes. No sweetening material is used for infants under six months; over that age a quarter-grain tablet of saccharine may be added. This quantity of apple-powder mixture is given hourly during the day and every two hours during the night. After twenty-four hours hot boiled whey is used instead of hot weak tea. On the third day the apple-powder paste is added to a hot mixture of a dried lactic-acid buttermilk made with one measure of the milk powder to 4 oz. of water. On the fourth day double the quantity of all ingredients is given every four hours, and from the fifth day onwards the buttermilk mixture is gradually replaced by skimmed milk and then whole milk. At this stage the amount of apple-powder is reduced and gradually it is discontinued.

Other contributors to the discussion were rather mixed in their views. Dr. R. L. T. Grant regards the introduction of apple diet for diarrhœa in infancy as one of the biggest advances he has witnessed, but Dr. N. Cockburn has met with little success in infants under nine months, though the remedy has been very useful at later ages. Most of these Australian speakers seem to be referring to a dysenteric type of disease for which the apple diet is particularly valuable, and it is not quite clear whether young infants with the acute dehydration and intoxication sometimes encountered would respond in the same way. Evidently, however, as Dr. Le Messurier pointed out, this diet reduces the risk of intoxication, since it is almost free from protein.

A SECRET OPERATION

Sir D'Arcy Power, whose articles on bygone surgery have until lately been so regular and attractive a feature of the *British Journal of Surgery*, contributes to an American journal an account of an operation secretly performed on a President of the United States.[2] On June 18th, 1893, Dr. Robert Maitland O'Reilly, medical attendant on Government officials in Washington, was asked to examine the roof of President Grover Cleveland's mouth, and to diagnose the nature of a "rough place" which had probably been present for at least a month. This proved to be an ulcer with some underlying diseased bone, but there was no enlargement of glands. The pathologist reported that the tissue was strongly suggestive of malignancy, the diagnosis was confirmed by Dr. Joseph D. Bryant, and immediate operation was advised. To this the President consented on condition that everything was done in secrecy. At that time the country was passing through a serious financial crisis, and the gold reserve in the Treasury was sinking dangerously. Cleveland had been kept desperately busy, so that his general health, and particularly his teeth, had been neglected.

The operation took place on July 1st on the yacht *Oneida*, which was lying at anchor a considerable distance from the New York battery. A day beforehand Dr. Edward Gamaliel Janeway, one of the most eminent diagnosticians of the time, went on board to examine the chest of the distinguished patient, who had arrived from Washington. The anæsthetic caused some anxiety, for the President was 56 years old and very fat. His neck was especially short and thick. While the yacht was going up the East River at half-speed Dr. Ferdinand Hasbrouck, a dentist, gave nitrous oxide and extracted the upper left bicuspid teeth. Dr. O'Reilly administered ether, while Dr. Bryant incised the roof of the mouth, with Dr. William Williams Keen and Dr. John F. Erdmann acting as assistants. The entire left upper jaw was removed from the first bicuspid to just beyond the last molar and close to the midline, but the floor of the orbit was left intact. The antrum was found to be filled with a gelatinous material, afterwards reported to be sarcomatous. The patient made a good recovery. The absence of an external scar—the entire operation had been done within the mouth—and the preservation of the normal voice and of the normal position of the eye, together with a skilled prosthetic appliance, helped to keep the operation a secret. Cleveland died fifteen years later without any recurrence of the growth.

THE IMMUNISING ANTIGENS OF SHIGA'S BACILLUS

THE Gram-negative bacilli of the typhoid-dysentery group were among the first organisms to be studied thoroughly by the agglutination reaction, and in consequence a large number of bacilli in the group have been described in terms of separate antigenic components. But owing, perhaps, to the relatively clear-cut answers given by agglutinin-absorption studies on these organisms, the analysis of the bacterial bodies into soluble antigenic components has not yet reached a stage comparable, for example, with that of some of the pneumococci and streptococci, and of the tubercle bacillus—all organisms whose agglutination reactions yield but little information about their antigenic structure.

The several attempts made to isolate antigens from the Gram-negative bacilli made it evident that, as in the pneumococcus, the specificity of their immune reactions depended in part upon complex polysaccharide substances. Dr. W. T. J. Morgan has previously reported[1] the isolation of a specific polysaccharide from Shiga's dysentery bacillus, which, though reacting with homologous antibody both in vivo and in vitro, was not itself fully antigenic after it had undergone the treatment involved in its isolation. Since then, starting from the observation that bacterial and other polysaccharides were fairly soluble in various glycols, but that proteins were almost insoluble, he has developed a method for extracting bacteria that may prove applicable to

[1] *Med. J. Austral.* 1937, 2, 756.
[2] Power, D'A., *Surgery*, 1937, 2, 780.

[1] Morgan, W. T. J., *Brit. J. exp. Path.* 1931, 12, 62; *Biochem. J.* 1936, 30, 909.

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a number of species.[2] By extracting acetone-dried Shiga bacilli with ice-cold water-free diethylene glycol, he obtained an apparently non-protein substance capable of inducing in rabbits a copious formation of specific antibodies. The sera of rabbits immunised with the substance also agglutinate sheep red cells—i.e., heterophile antibodies are produced. On acid hydrolysis, the antigenic material yields a lipoid-containing substance, and the specific polysaccharide previously identified. The power to stimulate heterophile antibody is destroyed by the action of mild alkali, a treatment that has little effect on the polysaccharide part of the antigen, and it appears that the heterophile antigenic structures are present in the as yet unidentified component of the Shiga antigen.

The immunising antigen of Shiga's bacillus is similar in its general properties to the antigens isolated from Gram-negative bacilli by Boivin and his co-workers, and from *Bact. aertrycke* and the typhoid bacillus by Topley, Raistrick, and others.[3] The successful isolation of these antigens seems dependent on the avoidance of any gross chemical treatment of the bacilli. The typhoid antigen was resistant to the action of trypsin, and was isolated from a tryptic digest of dried bacteria that had undergone no other treatment. The introduction of diethylene glycol as a selective antigenic solvent marks another advance in the technique of immuno-chemical analysis of bacteria.

THE INCREASE IN LONGEVITY

LAST week (p. 106) an American correspondent referred to some interesting observations made on the expectation of life by Harold F. Dorn, statistician in the United States public health service. Dorn calculated that a child born in the United States in 1933 could expect to live 12 years longer than his parents could have expected at their birth, but that to achieve the same increase during the next generation would require every new-born infant to live until nearly age 55, unless there is a sharp decrease in mortality at older ages. The prospect of either event obviously does not appear at all likely. England and Wales stands in much the same position, and it is perhaps not generally realised how much of the increase in the expectation of life in the past 40 years is due to the reduction of mortality in infancy and early childhood. The "expectation" is, of course, only a technical (and rather misleading) term for the *average* length of life that would be lived by a cohort of babies if they were exposed throughout life to the death-rates at different ages prevailing in a given place and time. For instance at the death-rates of England and Wales in 1930–32 the average length of life of males would be 58·74 years, of females 62·88 years. At the death-rates of 1910–12 the corresponding averages are 51·50 and 55·35. In other words, the expectation of life at birth has increased in an interval of twenty years by rather more than 7 years for each sex. On the other hand, if we survey the survivors at age 10 and measure their expectation, or average length, of life—i.e., subsequent to that age—then the increase between 1910–12 and 1930–32 is rather less than three years. At age 60 the increase is only two-thirds of a year for males, a year for females. At age 80 the expectation is actually a fraction lower in 1930–32 than in 1910–12. In other words, we have more persons kept alive until late adult life, but they can then expect to live little, if any, longer than their predecessors. Further reductions in the infant mortality-rate will, of course, somewhat extend the expectation of life but not, in accordance with Dorn's calculations, a very great deal. Can we hope to reduce the death-rates at older ages—from cancer, diabetes, heart disease, nephritis, and cerebral hæmorrhage? It seems more likely that we shall observe a slackening rate of improvement in the expectation of life in the next generation.

[2] Morgan, W. T. J., *Biochem. J.* 1937, 31, 2003.
[3] Topley, W. W. C., Raistrick, H., Wilson, J., Stacey, M., Challinor, S. W., and Clark, R. O. J., *Lancet*, 1937, 1, 252, 274.

CONCERNING MUMPS

BY "mumps," without qualification, is understood the affection of the parotid glands described by Hippocrates; but Dr. R. E. Smith[1] does well to remind us that any or all of the salivary glands may be involved and he has himself described a small epidemic in which the submaxillary glands were those chiefly affected. There can be little doubt that unrecognised solitary submaxillary or sublingual mumps may be the starting-point of an outbreak of parotitis. The usual complications of mumps may be secondary to inflammation of any of the salivary glands and it is possible therefore that reported examples of primary orchitis have really been secondary to unrecognised atypical attacks of this disease. From an analysis of the records, Smith concludes that the usual incubation period is 18 days (which agrees with that arrived at by Orr,[2] who applied the method of the periodogram); incubation periods longer than 25 days or shorter than 14 are rare. Accepting the results of an investigation carried out by the Clinical Society of London (1893), Smith says that mumps is infectious not more than 24 hours before the appearance of any swelling; but this is not the universal opinion. Rolleston[3] prefers to say "probably at least 24 hours," and although the evidence is not strong it has been asserted that mumps may be infectious towards the end of incubation. It is certain that in some cases prodromata such as sore-throat, coryza, stiffness of the neck, malaise, and pyrexia may precede the swellings by as long as 3 days, and such cases must be regarded as potentially infective although, as Smith remarks, mumps is probably the least infective of the common specific fevers of children. The duration of infectivity is doubtful; in Smith's experience at Rugby boys discharged a week after the subsidence of the last swelling or a fortnight from the onset (whichever is the longer) have given rise to no further cases, and he thinks it probable that these times could be shortened. Rolleston, indeed, says that swelling and infectivity disappear simultaneously. It may be added that the periods of segregation of other of the common fevers might be abbreviated with advantage not only to the patient but to the public purse. Rubella is a case in point; isolation for 5 days is ample. Since contacts rarely develop mumps, and originators of epidemics rarely give a history of contact, Smith believes that quarantine for contacts is wasteful. Provided that diagnosis and segregation are prompt, this will be generally agreed; mumps is not readily conveyed from person to person by droplet spray. It must be remembered that in the early stages the infective agent, generally accepted to be a filtrable virus, may be transmitted upon utensils or the hands of attendants from one child to another

[1] Smith, R. E., *Guy's Hosp. Rep.* 1937, 87, 447.
[2] Orr, H., *J. R. Army med. Cps.*, 1918, 31, 480.
[3] Rolleston, J. D., Acute Infectious Diseases, 2nd ed., 1929, p. 234.

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in a ward; nevertheless to quarantine the ward is rarely worth while.

Smith also discusses prophylaxis by means of convalescent serum and draws some analogies from the seroprophylaxis of measles. He concludes that given in small doses at the beginning of the incubation period mumps serum "appears to have definite preventive powers." But here again the relatively low infectivity of mumps must be borne in mind, and accounts of the successful prevention of mumps should for this reason be accepted with reserve. It is a question not of contact merely but of *effective* contact, and the same caution must be observed in assessing the results of the seroprophylaxis of measles under different degrees of propinquity. The intimate repeated familial contact that obtains in the tenement is by no means the same as the exposure—contact is hardly the word—that is likely in a children's ward. Allowing the potential prophylactic value of convalescent mumps serum, Smith makes the important observation that by artificially postponing an attack of mumps until the age of puberty there is a danger of encouraging serious complications, such as orchitis, rare or unknown among young children. Provided the correct dosage can be estimated, the use of serum to ensure a mild attack, from which the patient obtains lasting immunity, will usually be preferable.

THE CARE OF MENTAL DISORDER IN LONDON

THE immense scale of the coördinated provision made by the London County Council for the recognition and treatment of every sort of mental ill health is manifest in the annual report just issued [1] of their mental health services. The 33,000 beds in various mental hospitals represent only a part of what is done. For the defective there is a system into which enter school medical officers, supervisors who visit the patients' homes, occupational and training centres, and a venereal disease unit; attempts are made to place juvenile defectives in remunerative employment, and advice is given to the court about supposed defectives who have been charged with criminal offences. The work for mental disorder, including neuroses and the behaviour problems of children, interlocks with that of the general health department in such matters as the provision of psychiatric out-patient clinics at some of the general hospitals and in the psychiatric staffing of observation units. The trends towards coördination and grading are indicated in the decision that St. Ebba's Hospital (formerly called Ewell Mental Hospital) is to serve as a second string to the Maudsley Hospital by receiving, as far as possible, patients with a hopeful prognosis, but for whom a longer term of treatment is likely to be needed than for those generally regarded as suitable for the Maudsley Hospital, where accommodation is limited. At St. Ebba's Hospital an interesting experiment is being tried: patients who have recovered are taught a more congenial or suitable trade than they had formerly, in order that they may return to ordinary life with less risk of social difficulties and a further breakdown. The decision to omit the word "mental" from the titles of any hospitals in the service is welcome. Another desirable alteration in nomenclature would be the abandonment, in the report, of the old-fashioned diagnostic classification that has for so long been officially required by the Board of Control.

The statistics published in the report show some curious features. For example there is an extraordinary fluctuation in the number of new cases annually notified for the first time under the Mental Deficiency Act, 1913, whereas each year the number of defectives who require institutional care increases by about 250, and will probably continue to do so. In the greater part of South London an average of 6 patients is directly admitted to mental hospitals for every 10,000 of the population, yet in a part of North London the average is as high as 10; in some districts south of the Thames nearly a third of the patients admitted come into the mental hospital voluntarily, whereas in other districts of London only a sixth or an eighth do so. Between Jan. 1st, 1936, and Jan. 1st, 1937, "the unsatisfied demand for beds was mainly for cases of senile dementia." It must be a matter of conjecture to what this shortage is due: partly perhaps to the increasing number of elderly persons in our population, partly to changes in housing and social conditions which make people reluctant or unable to look after their failing relatives at home. Perhaps it is mainly an administrative question of making provision for the better nursing and care of senile patients formerly housed in general hospitals and institutions for chronic illness. On almost every page of this report the bald numbers raise questions which bald numbers cannot answer. Interesting and informative as are the detailed figures published, they are really only raw material on which the psychiatrist, the statistician, and the sociologist must get to work; for such purposes the London County Council can supply unsurpassed factual material, to be compared with that of Massachusetts or New York State.

The activities in psychiatric teaching and research are chiefly carried out at the Maudsley Hospital, a school of the University of London, where the creation of university chairs in psychiatry and in the pathology of mental disease (filled respectively by Prof. Edward Mapother, the medical superintendent, and by Prof. F. L. Golla, the director of the central pathological laboratory) establishes the coöperation needed for post-graduate education. Other signs of this development are the appointment of Dr. Aubrey Lewis as clinical director at the Maudsley to take charge of the clinical training of post-graduates and the coördination of research; the additional facilities provided at certain observation units for the fuller training of physicians and social workers, and the biennial refresher course for psychiatrists. Prominent among the research activities mentioned in an appendix is the work done by Mr. Grey Walter, partly in the central laboratory at the Maudsley and partly at Maida Vale Hospital for Nervous Diseases, on the application of the electro-encephalogram to the localising of cerebral tumours and the treatment of epilepsy. Investigation into prophylaxis of G.P.I. was being, during the year under review, conducted at the centre at Horton Hospital, and by Dr. A. Beck, one of the research workers at the central laboratory; special studies on mental defect and its pathological basis, on the effects of benzedrine, and on the inheritance of mental disorder were also carried out.

THE VALUE OF TOTAL OPIUM ALKALOIDS

SINCE it was first recommended by Sahli thirty years ago, a mixture of the hydrochlorides of the opium alkaloids in their natural proportions has been used extensively, under the name of Omnopon or Pantopon, in place of morphine. This preparation has been said to cause less nausea and vomiting and respiratory depression than morphine, and to be

[1] Annual Report of the London County Council, 1936. Vol. VI. London: P. S. King and Son. Pp. 69. 1s.

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more effective in relieving pain and relaxing spasm of plain muscle. Hayman and Fox [1] of Cleveland have now compared its efficacy with that of morphine sulphate in pain after operations, in renal colic, pleurisy, peritonitis, facial herpes, and other conditions, and in restlessness due to cardiac failure. Hypodermic tablets were prepared which were indistinguishable as regards their shape and colour, so that neither the patient nor the nurse knew which was being given. The effects of about eighty injections of omnopon were compared with those of about eighty injections of morphine sulphate. There was great variation in relief that the same patient got at different times from the same drug, but complete relief within half an hour was obtained from roughly 60 per cent. of injections with morphine sulphate gr. ¼, from 60 per cent. with omnopon gr. ⅓, and from 45 per cent. with morphine sulphate gr. ⅙. Nausea was noted in one patient after morphine and in three after omnopon, but there was no obvious difference in the amount of respiratory depression. Omnopon contains 50 per cent. of anhydrous morphine hydrochloride, and owing to the water of crystallisation in morphine sulphate there is only about gr. 1/25 less morphine alkaloid in gr. ⅓ of omnopon than in gr. ¼ of morphine sulphate. It seems then that the effects of omnopon —at any rate under the conditions of this test— do not differ appreciably from those of the morphine it contains.

INVESTIGATION OF ASTHMA

THE latest report from the Asthma Research Council [2] suggests that the attack on the allergic group of diseases is proceeding by small advances on a wide front rather than by any spectacular turning movement. Workers at Guy's Hospital have continued to review the efficiency of their armament by comparing the results of treatment with specific agents, such as sensitising proteins and autogenous vaccines, and those obtainable with indifferent agents such as sterile saline solutions. An allergen-free chamber has been installed and should be of value in simplifying the study of individual patients. Both at Guy's and at St. Mary's Hospital further investigation has been made into the psychogenic factors in asthma, and though there may be difference of opinion whether these factors are primary or secondary there is agreement as to their great importance. At St. Mary's much interesting work has been done on hay-fever, which is in many respects the disease best suited for research on allergy. It has been shown that hay-fever patients may be sensitive to, and may be relieved by treatment with, exotic pollens with which they have not come in contact, such as that of sugar-cane. These tests are taken as additional proof of the homogeneity of the pollen antigen and the uselessness of testing patients with a long series of grass-pollens to see "which is causing the mischief." More has been learnt about the chemical nature of the toxic substance in pollen and about the properties that develop in the serum after protective inoculation. Bacterial allergy and the toxins associated with focal sepsis have also been studied, but though a toxin indistinguishable from that present in the exudates and blood-serum in eczema, and in the blood-sera in other allergic conditions, has been detected in very many inflammatory conditions and in connexion with various septic foci, no broad ruling on the relation of "allergy" to "immunity" is at present possible.

At King's College Hospital remedial exercises have been under study since 1932 and the results are now being assessed for publication. All patients who have suffered from asthma for any length of time tend to develop a wrong way of breathing which increases the functional disability of the lungs. When they can be taught to acquire a perfect breathing technique about 85 per cent. of them show improvement. A revised edition of "Physical Exercises in Asthma" has just been issued at a price of one shilling, and any profits from this go to the Council's research fund. At Birmingham General Hospital and at Guy's Hospital workers have studied the value of the erythrocyte sedimentation reaction in prognosis and differentiation of cases of asthma. Work of a more fundamental experimental nature has been carried out at King's College and at St. Bartholomew's Hospital. At King's College the spontaneous variability of hypersensitivity has been studied and a number of chemical substances have been tested for their ability to reduce hypersensitivity in the isolated lungs of animals. At St. Bartholomew's Mr. J. L. D'Silva, Ph.D., has continued his important experiments on the mobilisation of potassium from the liver into the circulation after intravenous injection of potassium.

A number of promising openings have thus been made and it is a pity that others have been checked by shortage of funds. The treasurer hopes that all asthma sufferers who read this report will support the research work by sending donations; and when one compares the small income and disinterested service of the Asthma Research Council with the large sums spent on proprietary remedies for the disease, one trusts that this hope will be fulfilled.

ARE PROSECUTIONS FOR POISONING FAIR?

THE challenging paper on prejudicial assumptions in poison cases, read by Miss Alice Raven before the Medico-Legal Society last June, has now been republished separately.[1] Miss Raven finds the atmosphere of a criminal trial on a poisoning charge rather unfair. A case of poison is not necessarily a case of poisoning. Counsel need not keep talking about what would be a "fatal dose." She criticises certain traditional or customary assumptions to which both the prosecution and the judge give too ready a currency and which the defence fails to dissipate. Miss Raven takes, for the sake of argument, arsenical poisoning. Five points, she says, are likely to be too readily assumed. First, if post-mortem examination shows a sufficient amount of arsenic in the body to cause death, it is assumed that death was due to arsenical poisoning. Secondly, if there have been previous illnesses with similar symptoms, these previous illnesses are assumed to have been due to arsenical poisoning. Thirdly, if arsenic is found in a body it is assumed to have been administered with intent to murder. Fourthly, it is assumed that the person who has the best opportunity is the person who administers the arsenic; in other words, opportunity is deemed evidence of guilt. Lastly, a supposed benefit accruing to the person who has the best opportunity is assumed to be a sufficient motive for ending the life of the deceased. These five assumptions, Miss Raven observes, ignore the numerous accidental ways of taking arsenic. She reminds us of the known instances of arsenious oxide being used in error in preparing baking-powder, sugar,

[1] Hayman, J. M., jr., and Fox, H., *J. Amer. med. Ass.* Nov. 27th, 1937, p. 1814.

[2] Report of Progress for the year ended Oct. 31st, 1937. Copies can be obtained from the Asthma Research Council, c/o King's College, Strand, London, W.C.2.

[1] Westhope and Co., London, 6*d*.

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salt, cream of tartar, flour, and meal. There may, she says, be inhalation or contact from arsenical wood preservatives, fruit-tree sprays, or sheep-dip; chronic arsenical poisoning can come from the fine dust of wallpapers coloured with the green of aceto-arsenite of copper. There may be arsenic in the soil, arsenic in the glucose from which beer is brewed, and natural arsenic in plaice or soles, oysters or prawns. Miss Raven analyses two well-known poisoning trials in the light of her thesis, the Liverpool case of Mrs. Maybrick in 1889 and the Dorset case of Mrs. Bryant in 1936. The conviction of Mrs. Bryant depended in part upon an empty tin of weed-killer which the police recovered, rusty and battered, from a rubbish-heap. Analysis of scrapings from the outside and inside of this tin disclosed 5·8 per cent. of arsenious oxide. Sifted ashes from the grate of Mrs. Bryant's wash-house copper were found to contain 149 parts per million of arsenic, and the experts said that the normal arsenic content of ordinary coal ash would be about 100 parts per million less. The Court of Criminal Appeal rejected an application by the defence to call further expert evidence which might have put the normal arsenical content of coal ash higher. Bryant, says Miss Raven, worked on soil which contained arsenic. Daily and hourly he would be breathing it in and absorbing it through his skin in minute quantities of dust. This might have explained the arsenic in his body, which might also have been due to arsenical wallpaper in the cottage or to his having handled sheep-dip, or to his being (as she suggests that many farm labourers are) an arsenic-eater. In the result she concludes that it is easily possible for a person accused of poisoning to be hanged on insufficient evidence, and she demands a more rigorous standard of proof of guilt in such cases in future.

When anyone is charged with a horrible offence, prejudice is easy. The mere recital of the charge will make a juror instinctively think what a brute the accused must be. The crime of poisoning is, according to a statute of Henry VIII, of all kinds of murders specially to be detested and abhorred. It was described in the Act of 1351 as "in this Realm hitherto, our Lord be thanked, most rare and seldom committed and practised," and, when the Bishop of Rochester's cook "of his most wicked and damnable disposition did cast a certain venom or poison into a vessel replenished with yeast or barm" so that many died of poisoning, the crime of murdering by poison was exalted into treason and the punishment was ordained to be that of boiling to death. The Bishop's cook was duly boiled to death at Smithfield and a poor woman at King's Lynn, accused of having poisoned her husband, was soon afterwards punished in like manner. To-day, with better scientific knowledge, a less ferocious law, and a system of procedure which gives ampler opportunities to the defence, we may hope that there is less prejudice and fairer trial. But Miss Raven's warning deserves attention though possibly she under-estimates the insistence with which her points have been taken by defending counsel. The suggestion that the viscera of an exhumed body have been impregnated with arsenic from the surrounding earth has certainly been vigorously pressed in more than one recent trial.

THE NEW ST. GEORGE'S

IN their plans for rebuilding St. George's Hospital the authorities have kept two aims in view—to enhance its function as a teaching hospital and secondly to combine economy of space with room for expansion if necessary. The same generous proportion of 330 beds for 100 students is to be maintained, for there are to be 520 beds in the hospital, with 180 members of the medical school. With the same object and with possible changes of emphasis in the medical curriculum in mind, the special departments will be large enough for teaching purposes, and the increase in the number of beds is chiefly accounted for by the new wards for psychiatry (48 beds), obstetrics (48 beds), orthopædics and fractures (36 beds), and dietetics (24 beds). The total includes 51 private beds and cots and also 68 contributory beds—mainly in 2-bed units related to the main wards and thus available for teaching. These are intended for patients who can pay the whole cost either themselves or through contributory schemes. The general medical wards have 90 beds, including 8 for skin disease, and the surgical 120; there are also 16 beds for isolation and venereal cases. The main wards, each in charge of a sister, contain 30 beds, in two equal units for male and female patients. A unit consists of a large 12-bed ward which is subdivided by low glazed screens into bays of 4 beds arranged parallel to the windows. This will combine the maximum of air, light, and privacy with the minimum waste of the nurses' energy. There is also in the unit a smaller ward for 2 contributory patients, the remaining bed of the 15 being in a separate isolation ward. The two units have a common kitchen, general utility and clinical rooms, but different sanitary offices. A clinical theatre and the four main operating theatres will be placed together in a group. The ophthalmological, ear, nose, and throat, and gynæcological wards will have appropriate examination rooms and minor operation theatres. The fracture clinic will be part of orthopædic wards, and the cardiographic department, the chest clinic, and the dietetic department (with metabolic clinic and diet instruction room) are to be in close association with the medical wards. A new departure will be a department for research in industrial medicine. The plan used for the new Westminster Hospital of placing out-patient clinics in relation to the corresponding wards on each floor is not being followed, on the grounds that it will be uneconomical in staffing and in space; it is considered that a single well-planned room can be kept in constant use by many different clinics. The hospital building is to occupy a large site in the same position at Hyde Park Corner, and to make space a number of houses now used for nurses' quarters will be pulled down. It is to be 40 ft. higher and it will be faced with Portland stone to harmonise with other notable buildings in the neighbourhood. The competition for the selection of architects is now open until the end of August. Messrs. Lanchester and Lodge have been appointed assessors.

COURSE ON MENTAL DEFICIENCY.—Lectures and clinical instruction for medical practitioners on mental deficiency and allied conditions have been arranged by the Extension and Tutorial Classes Council of the University of London in coöperation with the Central Association for Mental Welfare. The course is intended for qualified medical practitioners who are concerned with the care of subnormal or abnormal persons. The first part will be held from March 28th to April 9th, when Dr. A. F. Tredgold will lecture on mental deficiency, Dr. A. Carleton Williams on administrative procedure in the ascertainment and treatment of the mentally defective, Dr. Henry Herd on the work of the school medical officer in relation to the mentally defective, and Miss Lucy Fildes, Ph.D., on the psychology of mental defectives. The second part will be given in the autumn. Further information may be had from Miss Evelyn Fox, University Extension Department, University of London, W.C.1.

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SPECIAL ARTICLES

CLINICAL EXAMINATION AND DIAGNOSIS IN CARDIOVASCULAR DISEASE

BY TERENCE EAST, M.A., D.M., F.R.C.P.

PHYSICIAN TO KING'S COLLEGE HOSPITAL, LONDON, AND THE WOOLWICH MEMORIAL HOSPITAL

THE method of clinical examination of the heart which is taught to students is no doubt founded on long-established practice and tradition. One cannot but feel, however, that many candidates who present themselves at clinical examinations have not derived as much benefit from studying these methods as might be hoped. When they go into practice, later on, one still meets with examples of diagnosis, or misdiagnosis, which show that the difficulties of clinical examination of the heart have never been successfully overcome. Anything that would simplify or systematise the elucidation and interpretation of physical signs might be useful.

WHAT THE STUDENT MUST LEARN

The expert, of course, can develop his own routine methods, choose his short-cuts, and learn his own tips. Lack of skill in the physical examination of cardiac cases really dates from early difficulties never being surmounted. Six months' clinical clerking is not long for a student to train his senses in the technique of inspection, palpation, percussion, and auscultation.

No doubt the two chief difficulties which confront the student are, first, the gaining of skill in these arts, and secondly, the mental synthesis of the data, which should have been correctly obtained, into a diagnosis.

And there are so many data in a cardiac case. As others have urged (Sir Thomas Lewis, and the American Heart Association), a cardiac diagnosis must cover at least several points, if it is to be at all comprehensive or practical. I will return later to this.

Perhaps one of the difficulties lies in this advantage that we have—we can obtain more accurate data about the function of the heart than of almost any other organ; and it is a complicated double pump at that. I refer to clinical means alone, and when we call to our help radioscopy and electrocardiography, and the study of the circulation-rate, our information is certainly abundant.

The ritual of inspection, palpation, percussion, auscultation is founded no doubt on a good plan. It encourages at first a general survey, and then focuses down on more local points. But the various data the eye obtains have little to do with one another: the state of the veins in the neck, the site and extent of the apex-beat, if visible; and any abnormal movements, distended vessels and so on, that may be seen. *Palpation* examines the movements, may detect thrills, feels the closure of valves.

The value of *percussion* of the heart is a vexed subject in some quarters. I will not discuss its failings and limitations, but I do think that a student should be trained to use his fingers in this way—he can abandon it later if he finds it of no help. He may at first find it useful to confirm his findings on palpation. Of course he must learn its limitations, and where it may fail or be deceptive. While on this topic one might suggest that it was time the curious little diagram $\frac{\text{iii}}{1 \mid 3\frac{1}{2}}$ was abandoned. I am afraid that it conveys little, and may introduce erroneous ideas about the size and shape of the heart. Not that I think it a waste of time for the student to try to diagnose cardiac enlargement. He must train his senses for this, and realise when they will fail him and when he can rely on them. The correlation of skiagrams and clinical examination will help him here in his training. *Auscultation* is mainly concerned with the study of the heart sounds and any murmurs, which may or may not indicate valvular disease or other pathological defects. Perhaps auscultation is the most difficult art the student must learn. Auditory data are always most difficult to interpret. The hearing seems to vary more in keenness than the sight or the touch. Sounds are remote and impersonal. Auscultation provides many data for mental synthesis. One wonders whether the ritual of auscultation, first at the apex, then at the pulmonary area, and then at the aortic area, and then at the tricuspid, is the best means whereby the student may collect them.

AN ANATOMICAL OR A PHYSIOLOGICAL BASIS?

It seems, in fact, that the data to be obtained by the senses have to be fitted into a scheme of examination which depend only on the methods employed; would it not be better to devise some scheme of examination to fit the data to be obtained? It might be easier for the student to have some scheme in his mind which would help him to find what he is seeking. At present he seeks it at random, and then has to try to put together what his senses have told him. Finally, when one comes to think of it, our present method of clinical examination of the heart lays very little stress on the detection of heart failure. This is really the most important thing of all: it is for this that his patients will come to him later on. It is true that the first indications of cardiac inefficiency lie in the patient's symptoms. One cannot speak too strongly of the necessity of a full and careful investigation of dyspnœa, indicating inefficiency or failure of the extracardiac circulation, or of precordial pain showing inefficiency of the intracardiac circulation.

Unfortunately the examination bogy casts its shadow before. A large proportion of the cases at a clinical examination are patients with "well-compensated" valvular disease. The student is often content if he can diagnose them and no more. Detection of failure of the circulation is in consequence overlooked. An *anatomical* basis of examination of a cardiac case is hardly satisfactory. But where we have an organ whose function can be so readily studied and so intimately examined, a *physiological* basis seems to offer a scheme into which the numerous data of clinical examination can be fitted. It has the advantage of linking up, at the outset, a student's physiological work with his clinical.

WHAT THE STUDENT SHOULD DO

The scheme I describe is one which I have used for several years, particularly in demonstrating to students the phenomena of circulatory failure. In such cases it seems to be of the greatest use, but it can of course be applied to all patients with heart disease.

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The idea is to follow the circulation of the blood—ride on a red corpuscle as it were—from the periphery to the heart, through the lungs, to the heart again, and then out into the arterial system. If one does this one impresses on the student that the thing that matters, first and foremost, is how the circulation of the blood is being maintained by the heart. He will then include in his study any lesion in the heart that may affect the circulation. Let him start at the periphery, noting cyanosis in the skin of the hands, ears, face, feet; œdema; the state of the capillaries and veins; and then let him note the veins in the neck, their fullness, taking into consideration the patient's degree of recumbency, and their degree of pulsation. He may now palpate the liver and feel for the spleen, looking for ascites and watching the effect of abdominal pressure on the filling of the external jugulars (if this is considered to be a useful practice).

Now he passes into the right auricle. We tell him it lies too deep for its enlargement to cause dullness as a rule. He should however look for dullness to the right of the sternum, which may be caused by it or other things. Next he should auscultate the tricuspid valve, and realise that it rarely produces any distinguishable murmurs. Then he should palpate over the right ventricle, and also note any bulging—it is surprising how few students know these cardiac surface markings—and then over the conus arteriosus, using finger-tips and palm. Then auscultate the pulmonary valves. Here, of course, the blood eludes us. But he must examine the lungs for œdema and the pleural sacs for hydrothorax. Estimation of the circulation-rate is a simple and practical way of demonstrating slowing of the pulmonary circulation. It may well find a part in any clinical examination, or at least in the demonstration of circulatory failure, due discretion being used. The left auricle is beyond our senses except in very rare cases of gross enlargement, unless we use X rays. He can then auscultate at the apex to observe the function of the mitral valve, and listen to the mitral first sound. The left ventricle now concerns him: the site, force, extent, rate, and rhythm; palpation will possibly suffice for most of these—percussion of the left border is held by some to be superfluous. In particular, in studying the mitral first sound, gallop rhythm should never be overlooked. Now he may pass up through the aortic valves, using auscultation, and palpation for thrills, and finally into the aorta. Here again he must glean what scanty data his senses may give him as to its enlargement. Finally he passes out into the arterial circulation: he palpates such arteries as he can get at (not omitting those of the feet), examines the only arterioles he can see, with the ophthalmoscope, feels the pulse, and takes the blood pressure, and may detect alternation. There is a good deal to be said for estimating the blood pressure at the end of clinical examination.

By this method the importance of the circulation is borne home to the student. He can always go back over any point that is obscure, or to correlate one finding with another. But he has a physiological scheme to work on, and on which to hang his data.

WHAT THE DIAGNOSIS SHOULD COVER

Finally, I would emphasise once more, as others have done, the wide scope of diagnosis in heart disease. The diagnosis, or better still diagnostic summary, should always take note of its data under these four headings. It is not of much importance in what order they come, provided they are all included.

1. Efficiency of heart and circulation.
2. Pathological changes (myocardial, valvular, pericardial, arterial).
3. Rhythm.
4. Ætiology.

If these four points are kept in mind, little will be overlooked, and the student will have grasped the important things about the case. Nothing is more interesting and valuable than the application of instrumental methods in the diagnosis of cardiovascular disease. But we must use them to help the student to sharpen his senses and to be able to rely upon his unaided perceptions. It is pitiable when a man says he cannot diagnose some arrhythmia because an electrocardiogram is not available, or gauge the size of a heart unless a skiagram is taken. He must know when the well-trained senses can help him no further. Because they cannot tell him everything, there is no reason why he should not master the difficult art of training them well.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENT)

NEONATAL MORTALITY

STUDIES in neonatal mortality have hitherto been made on a small scale, the data being collected painstakingly for the purpose. In a paper presented to a joint meeting of the American Statistical Association and the American Sociological Society on Dec. 28th at Atlantic City, Jacob Yerushalmy, Ph.D., made use of a novel and successful attack. Dr. Yerushalmy is on the staff of the New York State department of health and has had access to the birth and death records of this large State (outside of New York City). Excluding 16 deaths of unidentified infants and 1 neonatal death for which no record of birth could be found or secured, and excluding also births of non-resident mothers, Dr. Yerushalmy had records of 82,138 births and 2566 neonatal deaths in this population for the year 1936. Data from birth and death certificates were then assembled on a single set of punch-cards, by manipulation of which a most interesting series of tables has been constructed.

A number of observations made previously, though upon much smaller series, have been confirmed. Neonatal mortality was found higher among males than among females for every order of birth. First-born infants had a considerably higher neonatal death-rate than second-born infants (32·2 as compared with 26·1). Thereafter the death-rate rose with the order of birth until for tenth and later births it is found to be 54·2.

These facts will surprise no one. We are prepared also to learn that premature babies survive less often than full-term infants. However, the very great difference in risk as shown in the following Table certainly deserves attention. These figures fully justify the campaign which Dr. Julius Hess is waging in this country for special facilities for the care of the prematurely born.

So far Dr. Yerushalmy's statistics confirm existing faith. But his method of attack has also uncovered two correlations that appear to have a profound biological significance. He finds that in his material there is an association between the power of survival of the offspring with the age of each parent at the time of the infant's birth. This relationship is not simply due to the fact that older mothers are more liable to have borne several children. The influence

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FREQUENCY OF PREMATURE BIRTHS, AND NEONATAL MORTALITY FOR FULL-TERM AND PREMATURE INFANTS BY AGE OF MOTHER, NEW YORK STATE (EXCLUSIVE OF NEW YORK CITY), 1936.

Age of mother.	Frequency of premature births.*	Neonatal mortality-rates.*		
		Premature births.	Full-term births.	Full-term, single, and legitimate births.
Under 20 ..	60·5	369·4	15·5	14·1
20–23 ..	43·2	359·0	13·7	13·3
24–27 ..	36·4	397·8	13·5	13·2
28–31 ..	38·7	375·6	14·9	14·3
32–35 ..	42·0	428·6	15·7	16·0
36–39 ..	47·8	425·7	19·2	18·6
40 and over	56·3	430·2	25·3	23·6

* Per 1000 live births in each specified group.

of age of mother upon neonatal mortality is still apparent when "order of birth" is held constant. Even more astonishing and quite unexpected is the discovery that the age of the father exerts almost as great an influence on the welfare of the offspring as does the age of mother. And this again is no spurious correlation due to the correlation between age of husband and wife, for when age of mother is held constant the variation of neonatal mortality with age of father is still conspicuous. The mortality-rate starts high for very young fathers, drops to a minimum for fathers in the age-group 25–29, and thereafter rises with the father's age.

MEDICINE AND THE LAW

New Public Health Act Offence

ON Jan. 5th Harry Lovell, a rag-and-bone collector, was fined 40*s.* at Birmingham for infringing Section 154 of the Public Health Act of 1936, a new law of which he was probably unaware. He had distributed fountain-pens and a notebook to children under 14, after bartering for the articles which he collects. This was said to be the first prosecution of its kind.

The former law on the subject was to be found in Section 73 of the 1925 Act. It forbade a collector or dealer in rags or bones or similar articles to sell or distribute "any article of food or any balloon or other toy" from a cart, barrow, or other vehicle employed for the collection of rags and bones, &c., or from any shop or premises used in connexion with that kind of business. The purpose of this provision was obvious; its attempt to prevent the spread of vermin or infection was extended in some places by local legislation. The Local Government and Public Health Consolidation Committee, when framing the clause which became the present Section 154 of the 1936 Act, was made aware of difficulties encountered in enforcing Section 73 of the 1925 Act. Summonses against rag-and-bone dealers were sometimes dismissed because the dealer produced his *quid pro quo* (balloon, toy, or what not) from a bag or stock carried in his hand and not kept on the cart or barrow. Secondly, the words "any balloon or other toy" fostered forensic uncertainty. There is a principle of statutory construction known as the *ejusdem generis* rule. If a general word follows particular and specific words of the same nature as itself, it takes its meaning from those words and is deemed restricted to the same genus as those words. Thus the Prison Act forbade the conveyance into prison (with intent to facilitate the escape of a prisoner) of "any mask, dress or other disguise or any letter or any other article or thing"; the words "any other article" were held to include a crow-bar. But in a New Zealand case, where a statute for suppressing offensive publications used the phrase "advertisements or other publications," it was held that a pamphlet sold only as an appendix to a bona-fide medical work did not come within the phrase. Magistrate's courts in England had been invited to decide whether the words "other toy" in the 1925 Act meant some other toy of the same nature as a balloon; did the words include pencils, notebooks, or children's jewelry? To avert these technical problems the committee framed the new law in such a way as to forbid the rag-and-bone man (1) to sell or deliver, whether gratuitously or not, any article of food or drink to any person, and (2) to sell or deliver, whether gratuitously or not, any article whatsoever to a child under 14.

Duty to Notify Puerperal Fever

At an inquest on the death of two women from puerperal fever in the Melrose Nursing Home at Sutton the findings of the coroner's jury criticised the matron, a medical practitioner, and the local authority's deputy inspector of midwives and nursing-homes. The deaths were those of Mrs. Hodges and Mrs. Peskett. The pathologist who conducted the post-mortem examinations stated that he found septicæmia due to hæmolytic streptococcus. Twin daughters had been born to Mrs. Hodges in the home; both died, one from infection contracted in the home. An inquest had been held upon this death also; evidence was given that the two babies came in contact with the mother quite frequently.

At the inquiry into the two women's death it appeared that a Mrs. Skinner who showed signs of puerperal fever, was isolated and removed from the nursing-home to Queen Charlotte's Hospital. Mrs. Peskett, it was said, would also have been removed if her condition had not been too dangerous. A third patient, Mrs. Hodges, was admitted to the ward in the nursing-home which Mrs. Peskett had vacated, but was not placed in the same bed. The medical attendant of Mrs. Hodges notified her case when her temperature rose above 100° F. on Dec. 1st. He had not been aware of Mrs. Skinner's removal and he made no inquiries whether the nurses were infected, though he did inquire whether they were going to be examined. The medical attendant of Mrs. Peskett did not notify the case of his patient. He did not pass on to the matron any suspicion he entertained which would cause her to warn other patients against entering the home. The witness told the coroner that the matron informed him that she had not notified Mrs. Peskett's infection because she had not been in physical contact with her. The matron, in her evidence at the inquest, said that she asked Mrs. Peskett's doctor to notify the case because of the patient's high temperature; he replied that this was unnecessary but he would do so if she wished. She herself had not notified the case because the doctor did not do so; she did not report that she had been in contact with Mrs. Peskett because for nearly a month she had been off duty through neuritis and had not been in actual contact. Pressed by the coroner to explain why she had received Mrs. Hodges into the home on the day after isolating Mrs. Peskett, the matron answered that Mrs. Peskett's temperature might not have had a puerperal cause;

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as the doctor had not suggested it, it was not for her to think it had. Dr. John Beattie, who is available under agreement with the Surrey county council for consultation in cases of childbirth in his prescribed area, had visited the home on Nov. 28th at the request of Mrs. Skinner's medical attendant. He later saw Mrs. Hodges in the same ward. He gave evidence that he would agree with the pathologist's findings as to death; in the case of Mrs. Peskett there was an intermittent temperature of over 100° F. for eight days, which would be strong evidence of puerperal fever. He saw no signs in the ward of masks or gloves; droplet infection was common and masks ought to be the rule. There would be no excuse for the nurse who attended Mrs. Peskett to attend another patient at the same time. Dr. F. Langford, of the Surrey county council health department, said that the case-books of the home complied with the regulations. He visited the home on Nov. 30th when Mrs. Hodges and Mrs. Peskett were still there. He then asked the matron why she had not notified her contact with a suspicious case. During his visit on Nov. 30th he took swabs (nose and throat) of the staff. The matron was negative, the two nurses were positive, and a sister was negative as to the nose and doubtful as to the throat. He advised the matron that it would be very dangerous to admit anyone else for the present. Discussing the possible origin of the infection, he ascertained that a Mrs. Willard had been admitted on Nov. 8th who had a temperature of 101° F. on Nov. 16th and of 100° on the 18th.

The jury returned a verdict of "death by misadventure" in both cases. A rider was added which criticised the matron for having admitted Mrs. Hodges when infection was suspected. Another rider criticised Mrs. Peskett's medical attendant for failure to take adequate post-natal care.

AN INTERNATIONAL REVIEW OF INFECTIOUS DISEASES

THE report of the October session of the permanent committee of the Office International d'Hygiène publique contains much valuable information about the major epidemic and endemic diseases and the steps being taken to control them. The following selection gives some idea of the work of which the committee takes note.

YELLOW FEVER

In the first nine months of 1937 yellow fever has been rather more frequent in Africa than in the immediately preceding periods. Small epidemics occurred at Accra and Mepom (Gold Coast) and single cases were notified at Brazzaville and Bangui in French Equatorial Africa, both of which are areas in which the disease had not previously been observed. In South America it was notified from Colombia and from Peru, the latter being the first notification for a long time, as well as from the ptates of Matto Grosso, Minas Geraes, and Sao Saulo in Brazil. In the Anglo-Egyptian Sudan fresh work has confirmed the high proportion of sera positive to the mouse-protection test, the proportion reaching 70–80 per cent. in the region of the Nuba mountains. It would seem that yellow fever existed there in 1936 in the neighbourhood of Kau: a large number of sera of children under ten years old were positive in 1937, whereas in 1935 all sera of children of the same age had been negative. That of a European doctor who had lived in the area in 1936 was negative before and positive after his stay; in the interval between these two examinations he had had a slight attack of fever lasting 4–5 days.

Virus attenuated by tissue-culture, without the addition of immune serum, has been used with success in England on more than 600 persons with no serious reactions. In North and South America the Rockefeller Foundation uses a virus grown on tissue from chick embryos from which the head and spinal cord have been removed. This has been used without immune serum on more than 6000 persons with a proportion of 5–8 per cent. of slight reactions on the sixth or seventh day after vaccination. Two to six months after vaccination 51 out of 2200 persons vaccinated by various methods showed jaundice, as to the causation of which various explanations were advanced.

TYPHUS FEVER

Although fairly common in Czechoslovakia between 1920 and 1923, typhus has now almost disappeared from that country except in the mountainous region of the north of Russian Sub-Carpathia, into which it is thought to be introduced from Poland by smugglers. The local population is comparatively immune but persons coming from other parts of Czechoslovakia are much more severely attacked. Weigl's vaccine has been used since 1934 for persons particularly exposed to infection; no case of the disease has occurred up to date in 740 persons vaccinated.

In Morocco there were three serious outbreaks after following the bad harvest of 1936—i.e., near Marrakesch, at Fez, and at Casablanca. Blanc's living vaccine attenuated with bile was used to inoculate the great majority of the natives in the threatened areas: 44,655, 2962, and 146,283 persons were vaccinated in the above three areas respectively. This mass vaccination was followed by a sudden fall in the epidemic curve, even although no other prophylactic measures such as delousing were employed. According to carefully controlled mass observations, the total percentage of reactions was 0·61 among the natives and 13 among Europeans.

In Tunisia endemic typhus has persisted in a few areas and broke out between November, 1936, and June, 1937, with unusual virulence. The results of the classical methods of prophylaxis having therefore been judged insufficient, it was decided to employ, in addition to isolation of infected persons and delousing, vaccination with Laigret's vaccine—i.e., living murine virus incorporated in egg-yolk. This can be dried and suspended in oil at the time of inoculation and can therefore be sent considerable distances and used by doctors on the spot. A total of 3601 vaccinations were made in Tunisia in 1935–36, 27,941 in 1936–37, and it is hoped to raise the figure to 150,000 for 1937–38. In vaccinated subjects there were 32 cases of typhus with no deaths, but 27 of these fell ill during the first fortnight after inoculation. The incidence of typhus in the months following inoculation was 0·9 per 1000 in the vaccinated and 11 per 1000 in the non-vaccinated of the same communities. Three cases of murine typhus, with a rash but of an ambulatory type, were produced by vaccination.

SMALL-POX AND VACCINATION

A total of 5 cases of post-vaccinal encephalitis were notified in Great Britain in 1936 and 3 cases in the first eight months of 1937; 5 of these 8 were fatal: 4 of the cases were in young infants, the others were primary vaccinations in children of ten to fifteen years. In Germany 5 cases were confirmed in 1936, 2 in children of three months and one year, the remainder in children of three and four years old. In Italy 5 cases occurred in 1936 and 6 in 1937 out of 1,104,520 primary vaccinations and 1,205,971 revaccinations in 1936 and the spring of 1937. All the cases followed primary vaccinations and 6 occurred in children of ten to thirteen months, while 5 were in children between two and eight years old. In Sweden, during the period 1924–36, 54 cases were notified (43 primary vaccinations and 11 revaccinations), of which 11 occurred in the last four years. No case was noted in the first year of life; 6 were in children between one and two years old. The

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highest proportion of cases to vaccinations appears to occur in the age-period 5–10 years. Cases are scattered throughout the country and their frequency does not appear to be influenced by epidemics of poliomyelitis.

POLIOMYELITIS

Studies of several epidemics in Sweden show that poliomyelitis appears in several areas of a district at the same time and may be presumed therefore to depend on some external factor. Rainfall or thaws seem to occur some 10–20 days before each outbreak and cases appear first in the country and then spread to the towns, possibly through unpasteurised milk. Cases of reinfection have been noted and specific immunity does not appear to be important. In Italy, on the other hand, multiple cases in families or schools are almost never observed, nor is there a relation to the rainfall. In Switzerland, as compared with an average annual incidence of 300, 1269 cases occurred in 1936, and 1088 in the first ten months of 1937. Family cases are very rare but become commoner as an epidemic progresses.

SOME OTHER DISEASES

Scarlet fever.—In the United States scarlet fever continues to be mild in character. The case-incidence is 200 per 100,000 population and the fatality-rate is about 1 per cent. Active immunisation with Dick toxin makes little progress, except among those specially exposed to risk, such as nurses.

Bacillary dysentery.—In the Netherlands Shiga-Kruse bacillary dysentery has disappeared since the beginning of the century but small epidemics are fairly often observed, due to Flexner's or the Y bacillus, and particularly from Sonne's bacillus. Cases are mild but deaths may occur in children and old persons. The principal prophylactic measure is the discovery and elimination of carriers among food-handlers.

Tularæmia.—No further human cases of this disease have occurred in Czechoslovakia since the 1936 epidemic, but in the autumn of 1937 infected hares were found in two of the ten districts affected in 1936. Three human cases have been diagnosed in Germany, in 1931, 1933, and 1936, but the infection has not been discovered up to date in hares and rabbits. In Sweden 96 human cases were notified last summer, for the most part in the district of Bollnaes in central Sweden—the same area as was affected in 1934. The 3 first cases were caused by a hare found dead in the forest and an insect vector is suggested as the mode of infection for the remainder.

The representative of the United Kingdom on the committee is Dr. M. T. Morgan, of the Ministry of Health. Others present at the October meeting included Sir John Megaw, Sir Thomas Stanton, Colonel S. P. James, Dr. H. B. Jeffs, Dr. P. G. Stock, and Mr. O. F. H. Atkey.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index.

FROM A BACTERIOLOGICAL BACK-NUMBER

III

I HAVE recently retired prematurely from all active work and among the melancholy jobs which have arisen therefrom has been the weeding out of all the books that I have accumulated during my professional life. Long ago my household had issued the ultimatum that the house simply would not, and could not, hold any more of my books, so I was reduced to the subterfuge of transferring all my medical ones to my laboratory. I don't pretend that I always made an honest and conscientious use of the laboratory accommodation. In fact I was liable to draw the line rather arbitrarily and treat all books which were unsuitable for shelves exposed to the impertinent curiosity of a young family as *ipso facto* medical. Thus the Decameron and the "Loose Songs and Doggerels" of the Percy Folio came to find a place in my medical library. During the height of the Christmas deliveries the books reached me packed in strong wooden boxes. The fact that the boxes were superscribed with such famed and seasonable names as Haig and Haig and Johnnie Walker inspired the otherwise heavy work of unlading, and the van-men pocketed their tip wishing me a very merry Christmas with a twinkle in the eye and just a hint of caution in the voice. When I set about unpacking I was shocked to find that the first box was packed with culture tubes fully loaded with bacteria. My old laboratory assistant had touchingly thought that it would be a consolation to me in my exile to have this *hortus siccus* from the old life. I don't know exactly what he expected me to do with it. Bacteria are as awkward a domestic problem as discarded safety-razor blades; modern dustmen simply won't stand for them and you can't very well put them in plum puddings. So at present this formidable collection stands at the foot of my bed awaiting the services of an expert convoy to the nearest autoclave which unfortunately is several miles away.

It was not quite without emotion that I gingerly handled perhaps for the last time some of the vintage strains of those elusive little creatures to whose consequences and inconsequences I had devoted so much of my life. It was sad to say farewell to K.L.B. Park-Williams 8, that most pampered of the Lilliputian tribe. It had made me many a brave gallon of toxin though at times it was as fractious as a prima donna. I remembered almost affectionately how I had once run a needle charged with it into my finger and as I was Schick-negative it produced a nice little pure-culture abscess, teaching me that the diphtheria bacillus could still lash out with its tail after its teeth were drawn. Then there was B C G and Typhoid Rawling, not to speak of a collection of very anæmic-looking *B. mesentericus niger*.

On the whole bacteria are strange and unsuitable bed-fellows and definitely unadapted to the country life, and I shall share the relief of the rest of the household when my collection finds its last resting-place in the disinfector.

* * *

When I came to going through the books the task became progressively more depressing. It was almost like homicide to throw to the flames these old once-treasured companions. I wished for some young and docile disciple to whom I could have passed them on; but could I find any present-day medical student who has time to read Trousseau? I paid a penny a volume for the Clinical Lectures when I was myself a student and never got better value for money, for I never learnt more from any medical work. Then there were the "Memoirs on Diphtheria" of Trousseau's great predecessor, Bretonneau, also in the dingy brown covers of the New Sydenham Society's edition, and not to be discarded without a pang, Murchison on Fevers, Graves's Clinical Lectures, Snow on Cholera, Hilton's "Rest and Pain,"

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Gee's "Auscultation and Percussion," and Rickets on Small-pox—all hardly less worth reading than on the day of their publication and an invaluable corrective to the scrappy and heated-up fare of our tin-can age. I next unearthed that questionable but interesting classic, "The Extant Works of Aristotle"—I mean that uncanonical collection which for two or three centuries was the main guide or misguide of the ordinary man in matters of sex. I picked my copy off a Charing Cross-road bookstall. It was bound in a brown-paper cover and labelled "The Toilers of the Sea" by Nat Gould. I'm afraid I "bought" it in more senses than one. The old loose cover has gone, otherwise I should have presented the copy to a Victorian museum as an article of bigotry or virtue or both. And among the rest I found that greatest of all literature written by a medical man. It was labelled the "Works of François Rabelais, M.D." Strange that the addition of those two sober letters should give the necessary touch of pruriency to the title. It is a cheap ill-printed edition which I bought from a bookseller who, thinking he had fathomed my tastes, persuasively tried to press on me also a copy of Paul de Koch's "Devil on Two Sticks." It proved, however, to be the genuine and complete "Urquhart and Motteux" and I have, in fact, never possessed any more noble edition of this strange concoction of diamonds and dung. Though the world is so morbidly curious about him, Rabelais is probably one of the least read of the great authors of the world. He is essentially a "medical" classic and I doubt whether any but doctors can really stomach him. But he is not easy reading to anybody and to follow the wild flights of that reckless and teeming brain is calculated to make even the strongest head reel. Nothing to use his own expression, was "too hot or too heavy" for him. Listen to this profitable advice given to the good Pantagruel by his father the wise Gargantua:

"Now, in the matter of the knowledge of the works of nature, I would have thee to study that exactly; that so there be no sea, river, nor fountain, of which thou does not know the fishes; all the fowls of the air; all the several sorts of shrubs and trees, whether in forest or orchards; all the sorts of herbs and flowers that grow upon the ground; all the various metals that are hid within the bowels of the earth; together with all the diversity of precious stones that are to be seen in the orient and south parts of the world. Let nothing of all these be hidden from thee. Then fail not most carefully to peruse the books of the Greek, Arabian and Latin physicians, not despising the Talmudists and Cabalists; and by frequent anatomies get thee the perfect knowledge of that other world, called the microcosm, which is man. And at some of the hours during the day apply the mind to the study of the Holy Scriptures; first in Greek, the New Testament, with the epistles of the Apostles; and then the Old Testament in Hebrew. In brief, let me see thee an abyss and bottomless pit of knowledge; for from henceforward, as thou growest great and becomest a man, thou must part from this tranquillity and rest of study, thou must learn chivalry, warfare, and the exercises of the field, the better thereby to defend my house and our friends, and to succour and protect them at all their needs against the invasion and assaults of evildoers."

Medical education is here defined, but with what a grand sweep!

I think the works of François Rabelais, M.D., must be saved from the fire. I may have done with medicine and with bacteria and bacteriology but I still have to live, and in a somewhat difficult and depressing world. I may have further need of the doctor-curé of Meudon. But perhaps I had better rebind him in brown paper and label him "Cocktails and How to Mix Them" by Dean Inge or something equally misleading.

PROTECTION OF EYESIGHT

IN connexion with the fifteenth International Ophthalmological Congress in Cairo (briefly reported in our last issue) meetings were held by the International Organisation against Trachoma and the International Association for the Prevention of Blindness.

To the former body, over which Mr. A. F. MACCALLAN (London) presided, Dr. ROWLAND P. WILSON, director of the ophthalmic memorial laboratory at Giza, gave an address on the pathology of trachoma in which he said that the theory that it has a bacterial origin has now been abandoned, and attention is concentrated mainly on its resemblance to diseases caused by known viruses. In Egypt 90 per cent. of the population is still infected with trachoma, and the question of reducing this permanent scourge is closely connected with the social conditions prevailing. The excellent work done at present in Egyptian hospitals can do no more than diminish complications resulting from trachoma and thus reduce the incidence of blindness.

Dr. A. BAILLIART (Paris) presided over the International Association for Prevention of Blindness, and Mr. MACCALLAN discussed the measures adopted in Egypt. The ophthalmic campaign inaugurated 34 years ago, and especially the establishment of travelling ophthalmic hospitals, has, he said, reduced the incidence of blindness among patients attending ophthalmic hospitals by a third. Dr. F. PARK LEWIS (New York) spoke on the responsibility of the ophthalmologist in the conservation of sight. The prevention of blindness is as worthy of consideration by ophthalmologists as either research or surgical care. The blindness that comes from negligence, from ignorance, from indifference and the crudities of living and its mismanagement is universal. The proportion of eyes that are lost and might be saved by preventive measures is greater than the proportion in which sight is restored by science and by surgical skill, and the results are better.

Mr. JOSEPH MINTON (London) read a paper on prevention of industrial eye injuries. An investigation had been carried out by him at the Royal Eye Hospital, London, where over 7000 patients attend every year suffering from such injuries. The present high numbers are due to (1) the non-provision of safety measures by employers and (2) the indifference of workmen to the risks entailed in their work and their neglect of the means of prevention supplied to them. Mr. Minton has organised a museum of preventive measures in the out-patient rooms at the Royal Eye Hospital; the patients thus have an opportunity of studying the preventive appliances and of choosing the one most suitable for their work. If other hospitals situated in industrial centres would take an interest in preventive work a diminution of eye injuries and consequent damage to eyesight would follow.

Mr. LEWIS H. CARRIS (U.S.A.) read a paper on the rôle of the social worker in a campaign for preventing blindness. Educators, public health officials, nurses, industrialists, sanitary engineers, social workers, and all in any way concerned in human welfare must take their place in the attack upon this social enemy. The world at large must be taught the causes of blindness and of defective vision, the place of nutrition and hygiene in relation to the health of the eye, and the methods of safeguarding the eye against injury and harm, and of keeping it in a state of greatest possible usefulness.

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CORRESPONDENCE

THE LONDON M.B. FINAL

To the Editor of THE LANCET

SIR,—The leading article in your issue of Jan. 8th renders an important service by bringing into the open a discussion which, as a note in your issue of Oct. 23rd (p. 972) revealed, had long pursued a subterranean course.

Any alteration in the final M.B., B.S. examination, in the direction of lowering its standard, must interest most particularly the medical graduates of London University. That they should have been kept in ignorance of a movement which was being actively discussed, as your note declared, "in academic and collegiate circles," was obviously unfair. Accordingly, the University of London Graduates' Association, in its covering letter supporting the candidature of Mr. Philip Mitchiner for the vacancy in the representation of medical graduates upon the senate occasioned by Mr. Walter Spencer's retirement, deemed it proper to acquaint the graduates with the main outline of the proposition for such an alteration of degree submitted to the senate of May, 1937, by the board of the faculty of medicine. You rightly say in your leader that Mr. Mitchiner's election, not yet completed but now assured, will "strengthen" the party opposed to the proposition emanating from the board of the faculty of medicine. It may interest your readers to know that within ten days of the issue of Mr. Mitchiner's address, in which he declared his opposition to the proposition, and six weeks before polling day, considerably more than one-third of the whole accessible electorate had signified in writing their intention to vote for Mr. Mitchiner and their desire to add their names to any list of his supporters. In an experience of 32 years of this particular electorate I have never known a more explosive expression of opinion than is represented by this response, which leaves no doubt of the resentment felt by graduates against the proposition.

The scheme submitted by the board of the faculty reproduces in all essential particulars the scheme brought before the Haldane Commission in June, 1911, by the two then presidents of the Royal Colleges. That scheme was to the effect that the final qualification of the Conjoint Board should excuse students who had passed the second M.B. examination from the examination in medicine, surgery, and midwifery of the final M.B., B.S. Lond. The Haldane report of 1913 contains an admirably reasoned argument, even more cogent now than then, for its rejection, which was made in the following pregnant final sentence: "We cannot recommend that the University should agree, perhaps irrevocably, to the examination of its students by examiners appointed by an external authority." The Commissioners did more than reject the proposition: they made provision against its revival. Their comment on this question resulted in the framing of the current statutes which expressly forbid the delegation of examining for the final M.B. to any outside body. Reversal of this statutory prohibition will probably require the consent of Parliament. If I know anything of that august assembly, after more than thirteen years of continuous membership of it, that consent, in view of the history of the question, will be difficult to obtain.

Of the 22 members of the faculty board 9, including its chairman, were not graduates of the University, and in the case of several of those who were graduates their loyalties lay with the Royal Colleges rather than with the University, facts which may explain the decision of the Board, reached by a moderate majority vote, to renew the suggestion made to the Haldane Commission by the presidents of the Royal Colleges 25 years ago, and decisively rejected by it. The pretext for this renewal—and I submit it is no more than a pretext—was found in a pronouncement by the court to the senate in December, 1936, communicated to the faculty board and forming the justification of its report to the senate. This communication, the sole authoritative statement upon this subject, is so important that I reproduce it.

"In making their grants to schools, the Court's attention was again directed to the small number of students in medical schools who take a university degree, and the Court resolved that, in communicating to the medical schools the Court's decisions with regard to grant, those schools be informed that the Court have noted with regret that in comparison with the rest of the country the number of London students who achieve a university degree is very low; that they are aware that the causes contributing to this are many and complex; that the recent changes in the scheme of the examinations of the University may have the effect of making a degree more easily accessible; and that the Court hope that at the end of the next quinquennium the figures will show an improvement."

It will be discerned at once that the full text makes nonsense of the contention, so often advanced by those who are responsible for this movement, that the grant-giving body is exercising pressure upon the University which would justify so revolutionary and discreditable an expedient as the lowering of the standard of the M.B., B.S., and inviting the coöperation of an outside non-university and non-teaching body in so important an examination as that for the final degree in medicine. The faculty board's proposition is all the more surprising in that it completely ignores the revision of the medical curriculum for which the board was so largely responsible and upon which the court rightly based its confident expectation of improvement of the position, and further, in proposing that an agreement should be made exclusively between London University and the colleges, ignores the Universities of Oxford and Cambridge, which took a prominent part in that revision and which send so large a proportion of students to the London medical schools.

You touch lightly upon the consideration that the proposed coöperation would injure and perhaps extinguish the external degrees in medicine. The faculty board were informed this probable effect but pursued the project undeterred—and thereby revealed their abysmal ignorance of the history of a struggle which very nearly wrecked the University, and, if revived, would do it incalculable damage. You rightly point out that the acceptance by the schools of the Exchequer grant for university education imposes on the schools a contractual obligation to "maintain training of a university standard." The medical schools take nearly a quarter of the whole annual grant to London University. They are the only schools which admit a large proportion of non-university students to their classes. The Haldane Commissioners were so gravely dissatisfied with this position that they recommended the restriction of full university recognition to only three hospital schools which should admit undergraduates of Oxford, Cambridge, and London alone. A long-overdue reform was initiated by my own school, St. Mary's Hospital, just three years ago, when it

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announced its intention to admit in the future only students entering for a university degree. That example has been followed to such an extent that at the present time, taking an average of the 12 medical schools, London undergraduates form nearly three-quarters of the whole student-body, the other quarter consisting of Oxford, Cambridge, and Conjoint students.

When one compares this position with that of 25 years ago when the Haldane report stated that "less than one-third of the students of London medical schools were undergraduates of London University," one may perhaps find the explanation for the present desperate anxiety of the Royal Colleges to safeguard the existence of conjoint students, thus threatened with exclusion from the London medical schools, by coming to an agreement with London University that might save the situation for themselves but at the cost of destroying the present high reputation of the M.B., B.S. Lond. The University is under no obligation to the Royal Colleges to justify that sacrifice. A former very famous principal of King's College, giving evidence before the Haldane Commission, said bluntly that the real reason for the small number of students in London medical schools who took a university degree was because "we have in the Conjoint Board the competition all through a student's career of a lower standard, and that has a very bad effect." The commission concurred with that explanation but none the less rejected the solution that would meet that competition by surrender of standard in the degree examination. All recent developments indicate that that competition, serious 25 years ago, is diminishing daily and is destined to disappear in the not remote future. The University is working out its own salvation and is rapidly reaching the aim you set before it, when "the normal sequence of an ordinary conscientious undergraduate's course of study" will be the award of the London degree, unimpaired in prestige and value.

I am, Sir, yours faithfully,

Wimpole-street, W., Jan. 8th. E. GRAHAM-LITTLE.

EARLY TREATMENT OF CATARACT

To the Editor of THE LANCET

SIR,—A recent report on cataract by the Prevention of Blindness Committee (66, Victoria-street, London, S.W.1) deserves more publicity than perhaps it has had. It comments among other things on the number of cataract cases that are not submitted to operation and it suggests possible remedies for this. I wish here especially to point out that early recognition of cataract, and continued close observation with tactful encouragement to the idea of operation, when this seems the best course, is of the utmost importance, and lies very often with the general practitioner. The report has mainly panel patients in mind.

We ophthalmic surgeons do not see more than a few of our cataracts early enough. It has been my unfortunate experience to have seen many at a stage when intra-ocular complications could not be detected, and operation is apt to be blamed for an unsuccessful result. One patient with glaucoma simplex without any lens opacities had been told by his doctor over a long period to "wait till the cataracts are ripe"; he was blind and nothing could be done. Only an expert can tell whether a cataract case has or has not glaucoma as well, and this is much easier at an early stage. Tobacco amblyopia along with cataract often presents difficulties and is apt to be missed. Too often these cases drift to an optician who wastes valuable time in trying many glasses while the optic nerves go on towards atrophy. One can only hope that if registration of opticians comes about it will be an offence not to refer all cases with early lens changes to an ophthalmic surgeon.

But the main object of this letter is to stir up the practitioner to a lively recollection of his responsibility in the matter of early cataract. The whole idea of "waiting till ripe" should be regarded as out of date. Modern methods of operation have largely done away with this period of long weary waiting in semi-darkness. The person to decide is the ophthalmic surgeon.

I am, Sir, yours faithfully,

Nottingham, Jan. 6th. A. CHRISTIE REID.

CHILD DISCIPLINE

To the Editor of THE LANCET

SIR,—In your issue of Jan. 1st Mr. A. S. Neill defends his fancy for rewarding the thieving child when it steals. Different people obtain the same effects on children by very different ways, and a child by no means necessarily needs the same methods of discipline in all the phases of its childhood. Thus the practical details of daily discipline depend too much on personality and are too variable to be discussed with profit, and I was careful in my address (Dec. 25th, 1937, p. 1469) to say that it was the principles underlying Mr. Neill's practice in this matter to which I objected. These he enunciates with some assurance: "juvenile stealing is emotional; it is symbolic; the stolen money or trinkets symbolise the love that the child feels he hasn't got. By giving him a reward (that is a love token) I give the child what he is looking for and he doesn't then require to steal. The other way—the appeal to reason—does not work, naturally, for the fundamental motive is always unconscious." This underlying principle, this explanation, this exposure of the "root cause," is to me no more than an unverifiable hypothesis in which I feel no obligation to believe. I see no reason to think that such unconscious motives are able to cause, still less to "require," specific acts on the part of a child; and why should they, out of all the motives in operation, be exalted to the key-position which Mr. Neill gives them? To my mind these psychological explanations of cause and effect are not impressive. Some of them have the appearance of containing an element of truishness, while others are so bizarre as to make a nightmare of life; but on the whole they leave out too much and are too facile to be acceptable.

John in Mr. Neill's narration is a case in point. He writes to his mother in pencil and gets back a letter remonstrating with him for his slovenliness. It is not difficult to suppose that in the conditioned atmosphere of Mr. Neill's school this chilly breath of criticism ruffles the boy's temper and he is ready for a row. He falls foul of the cook and develops his best form in the hope, it may be, of getting some appetizing love token off her. But Mr. Neill will have it that there is more to it than this, and that the boy was led ("required," I suppose,) to row the cook in particular as "the best mother substitute—the food-giver." I see no reason to take this on, especially as I have an uncomfortable feeling that, had the boy shown his irritability by kicking the dog or punching the head of his neighbour, some equally specious explanation would have been forthcoming. As I understand it John is aware of his mother's displeasure and this he interprets, none too

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sportingly, to mean a lack of love on the part of his mother. There seems small need to invoke an unconscious motive, and still less to make it responsible for the precise action which the boy takes. I hold no brief for John, conscious or unconscious; but Mr. Neill's art portrays him to me as a boy who knows his way about his school without the assistance of any unconscious direction.

I cannot forbear to acknowledge the kindly insinuation of Mr. Neill's concluding paragraph. But he may be reassured: I inhabit, alas, no such world. I am, Sir, yours faithfully,

Harley-street, W., Jan. 7th. REGINALD MILLER.

ROYAL MEDICAL BENEVOLENT FUND

To the Editor of THE LANCET

SIR,—I am extremely grateful for the most generous response which has been made this year towards our Christmas gift fund. The amount subscribed, £979 3*s*. 8*d*., has enabled us to give a Christmas gift of 30*s*. to every one of our regular beneficiaries. My thanks are due to you, Sir, for bringing the appeal before your readers, and to all who responded we desire to express our very sincere thanks. The committee is equally indebted to the many secretaries of medical societies, panel committees, hospital staffs, and divisions and branches of the British Medical Association, who brought the Christmas gift appeal to the notice of their members and who arranged for collections to be made at meetings, or donations to be voted. No less than 115 cheques from the above-mentioned secretaries, amounting to £511 15*s*. 8*d*., have been received.

We are particularly impressed by the spirit of goodwill and friendship shown towards the work of the Royal Medical Benevolent Fund in the letters received from many contributors. Practically all "wish every success to the appeal," others refer to the object of the appeal as being "most deserving." It is clearly shown that it is the desire of members of the medical profession to extend sympathy and practical help, through the agency of the Royal Medical Benevolent Fund, to those members of the profession who are living in adversity. My committee is confident that it is the wish of all that the Fund should be worthy of the traditions of our great profession—to be able to give adequate help to those in need. Great advance has been made since the early days and much has been done. We look now to those who have not yet become annual subscribers to join in with us during 1938.

I wish all a happy New Year and I thank you for the generous coöperation extended by you and your readers to the Royal Medical Benevolent Fund.

I am, Sir, yours faithfully,

THOS. BARLOW,
President.

11, Chandos-street, Cavendish-square, W., Jan. 5th.

PS.—Extract from one of many letters of thanks from beneficiaries. The writer is a widow aged 63 suffering from asthma and bronchitis. "Will you please give my very sincere thanks to the committee for the generous and unlooked-for Christmas gift. It came as a most timely gift. A month ago my doctor ordered me to bed and said that the fire must be kept going night and day, so instead of a 2*s*. 8*d*. bag of coal I was able to get ¼ ton. I felt it was being very extravagant and yet on Christmas Eve after the light was turned out it was lovely to lie in bed and think of all the blessings one was enjoying through kindness of unlooked-for friends."

HIRE-PURCHASE RESEARCH

To the Editor of THE LANCET

SIR,—The council of the Medical Defence Union is somewhat disturbed at the continuing volume of requests it receives for advice and assistance from practitioners who have entered into contracts with a body known as the Consolidated World Research Society Ltd. In your columns on Feb. 6th last there appeared under the heading "hire-purchase research" an excellent little article on the activities of the society already named. That article set out in full the type of encyclopædia which is proffered by representatives of the company to members of the medical profession. It also drew attention to certain privileges which canvassers claimed to be invaluable to any practitioner engaged in active practice. For the sum of £19 10*s*. there is offered (*a*) perpetual illustrated quarterly extension service for a period of ten years, (*b*) binders for the quarterly extension service, and (*c*) membership of the Consolidated World Research Society Ltd. for ten years. The purchaser is required to make a declaration that he has entered into this contract solely upon the terms and conditions contained therein and irrespective of any representations made to him by the company's representatives. Apparently many practitioners sign these contracts without reading carefully the declaration they have to make and then subsequently they express dissatisfaction with the services rendered, particularly those dealing with medical research. Under this heading subscribers are informed that they may approach the research department of the company for information on medical subjects in which they have a professional interest. You, Sir, rightly drew attention to the privileges of membership and stated that so far as they depend upon the printed agreement they lacked both definition and value. I should like to quote the following extract from your article, for it may on this occasion be read by many practitioners who did not have an opportunity of reading it previously, and they may thus become aware of the need for exercising care when entering into a contract as described above:

> One, at least, of the medical subscribers has placed on record his experience of them. He signed a printed contract and paid a deposit of £1 10*s*., but, being dissatisfied with the representations made to him by the company's agent, he afterwards repudiated the agreement. The company issued a summons in the county court, claiming £18 as the balance due for purchase of the encyclopædia. The defendant doctor, having taken the advice of the Medical Defence Union, put in a defence on oath in which he gave his own version of the transaction as follows:—
>
> "I accepted the verbal offer of the representative of the plaintiffs . . . that, for a fee of £1 10*s*. down and ten subsequent yearly payments of £1 10*s*. each, the plaintiffs' society would answer any research questions by me up to a specified number per annum, and I made the first payment of £1 10*s*. to him accordingly. . . . I discovered I had been fraudulently deceived and misled by the plaintiffs' representative, and applied to the plaintiffs for a return of the £1 10*s*. paid by me. Any contract set up by the plaintiffs as made by me to purchase any encyclopædia or other books was obtained by fraud and wilful misrepresentation by the plaintiffs' representatives."

It must have been an uncomfortable reply for the Consolidated World Research Society Ltd. to receive. No commercial undertaking can relish so wholehearted an allegation that its agents are obtaining business for it by fraud. The defendant doctor, however, was not given the opportunity to repeat his story in court. A few days before the date fixed for hearing, notice to discontinue the claim was filed

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on behalf of the society. If the society feels it has been unlucky in devising a system of enterprise which permits such allegations to be made, it will doubtless reconsider its method of doing business.

Furthermore, members of the Medical Defence Union are requested to communicate with its secretary before entering into any contract with the Consolidated World Research Society Ltd. At the same time it would be desirable for them to indicate the scope and character of any representations made by any canvasser employed by the above society when approaching him on its behalf.

I am, Sir, yours faithfully,

ROBERT FORBES,
Secretary.

49, Bedford-square, W.C., Jan. 7th.

MELANOSIS COLI

To the Editor of THE LANCET

SIR,—Until recently melanosis coli was almost universally regarded as the direct result of constipation. In my paper in the *Guy's Hospital Reports* for October, 1937, I brought forward evidence, derived from the admirable clinical investigations of Dr. H. L. Bockus and his colleagues and from my own observations, to show that it was the artificial diarrhœa produced by aperients taken on account of constipation and not the constipation itself which caused melanosis. There is still insufficient chemical evidence to show with certainty whether the precursor of the melanin is a product of the decomposition of proteins in the semi-liquid contents of the colon, or whether, as Bockus believes, it is a constituent of anthracene laxatives, although such evidence as there is is certainly in favour of the former theory. In view of the fact that anthracene laxatives are nowadays habitually used far more frequently than any others it is natural that most patients with melanosis should have treated their constipation with these drugs, but the patient described by Williams, a woman of seventy-four, had for the last forty-three years of her life taken only a grain of calomel every night or on rare occasions a blue pill or grey powder.

The frequent association of melanosis with carcinoma of the colon affords, I think, conclusive evidence against Bockus's theory. Stewart and Hickman [1] found melanosis visible to the naked eye in 49 per cent. of 43 autopsies on cases of cancer of the colon compared with 13 per cent. of 284 non-cancer cases, all being over the age of forty. In a microscopically investigated series of 100 cases of cancer of the colon they found a still higher incidence—55 per cent. of melanosis visible to the naked eye and an additional 13 per cent. in which melanosis was found microscopically. In 50 out of 60 cases the melanosis was present only above, or was more marked above, the growth, in 9 it was the same above and below, and in only 1 was it more marked below. The stasis of semi-fluid fæces in the colon proximal to the carcinomatous obstruction must lead independently of the taking of aperients to excessive putrefaction and the production of excess of the substances which form melanin on absorption by the mucous membrane.

Dr. Bockus is thus incorrect in his statement that my evidence against his views was based upon two case reports; these were not quoted with this object at all, but in order to show that melanosis coli disappears when the artificial diarrhœa caused by aperients ceases.—I am, Sir, yours faithfully,

ARTHUR F. HURST.

New Lodge Clinic, Windsor Forest, Jan. 8th.

[1] Stewart, M. J., and Hickman, E. M., *J. Path. Bact.* 1931, 34, 61.

WHO PAYS THE DOCTOR CALLED TO AN ACCIDENT?

To the Editor of THE LANCET

SIR,—I was a little surprised, when reading your annotation in your issue of Jan. 1st to see that you made no mention of Sections 16 and 17 of the Road Traffic Act, 1934. In order to make exactly the provision for which you pointed out the need, Parliament enacted that when treatment or an examination is immediately required as a result of a motor accident and is given by a registered practitioner, the person using the car must pay the doctor a fee and expenses. If more than one doctor gives emergency treatment, the car-user need only pay the first to give it. The fee is 12*s.* 6*d.* for each person treated, and the expenses are 6*d.* per mile coming and going for any journey the doctor has to make over two miles from where he is called. If treatment is first given in hospital, the fee is payable to the hospital.

The doctor may claim his fee by word of mouth at the time, or may request it in writing, but he must serve his request on the user of the car within seven days, signing it and stating his name and address, the circumstances in which he gave the treatment, and that it was first given by him. If the user refuses to pay, the doctor can recover the fee as an ordinary debt. The chief officer of police must give the doctor any information he can about the identification marks of the car or the name and address of the user.

It is possible that doctors and hospitals have not made much use of these provisions, and I cannot recollect seeing any mention of them in any legal or medical paper since the Act was passed. The question of who is using the motor-car at the particular time may raise difficulty, and few doctors have time to take steps to trace an elusive user or sue an obstinate one. The sections, of course, apply only to motor-car accidents. I should be very interested to hear any experiences about their working in practice.

I am, Sir, yours faithfully,

D. HARCOURT KITCHIN.

London, E.C.4, Jan. 11th.

INDEX TO "THE LANCET," VOL. II, 1937

THE Index and Title-page to Vol. II, 1937, which was completed with the issue of Dec. 25th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

ROYAL MEDICAL BENEVOLENT FUND.—At a recent meeting of the committee eight annuities were awarded, and forty-five grants, amounting to £1204, were voted to beneficiaries. Among thirteen new applicants the following particulars are given of two cases:—

M.R.C.S. Eng., aged 70. Married. Invalided out of R.A.F. with glaucoma in 1926; has not been in practice since but has been able to earn a very small and precarious living by writing medical articles in the press. This source of income is ended owing to blindness. His wife, aged 58, has had several attacks of cholecystitis due to gall-stones and may have to be operated on in the near future. Private income nil. Fund voted £100.

Daughter, aged 60, of F.R.C.S. Eng. For 29 years has worked as a matron at two private schools, but had to give up her work in 1933 owing to phlebitis and varicose veins. She has been living on her savings which are now reduced to £30. She has no relations who can help her. Fund voted £36 and is obtaining assistance from other charities for this most deserving case.

Subscriptions and donations are urgently needed, and cheques may be made payable to the hon. treasurer, Royal Medical Benevolent Fund, 11, Chandos-street, Cavendish-square, London, W.1.

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CROYDON TYPHOID INQUIRY

(*Concluded from p. 113*)

Evidence of the Consulting Analyst

IN the course of his examination by Sir Walter Monckton (counsel for the Croydon Corporation) on Jan. 4th, Dr. E. V. Suckling said it was improbable though not impossible that infection reached the well from the gathering ground, and that the most likely source of pollution there was the latrine trench near the heading. Some unidentified carrier could not be excluded, but the most likely cause of the outbreak was a carrier in the well. Carriers may be fæcal or urinary, the fæcal being the commoner, and a person may be a carrier only intermittently. To acquit an established carrier even five or six examinations at intervals of six days would not be conclusive, and more would certainly be needed with a urinary carrier.

DR. SUCKLING EXAMINED BY COUNSEL FOR THE TYPHOID OUTBREAK COMMITTEE

Mr. Gates asked how infection could have been introduced by the workman "Case A," seeing that he was almost certainly not a urinary carrier and it was impossible for anyone to have excreted at the bottom of the well. Dr. Suckling said that, in spite of the examinations that were made, this man may have excreted typhoid bacilli at some time in his urine, as more than half of carriers of the fæcal type had been found to do intermittently. The presence of large numbers of *B. coli* in the water could not be due to the carrier, and showed that sewage contamination was present also. The sewage of large communities (such as Edinburgh) usually contained small numbers of typhoid bacilli. "Case A" was, he thought, a chronic carrier and had been one for many years. Pressed by counsel he said it was possible that "Case A," who had had typhoid during the war and was therefore immune, might have become a carrier through drinking typhoid bacilli in the well water.

Asked by Mr. Gates how often he would advise sampling a water-supply, Dr. Suckling said that this depended upon many factors, but he did not agree with the practice of going from April to September without a sample. He agreed that the analyses of the Croydon supply did not tally with current procedure; there were no counts of agar plates and no attempt to define the type of coliform bacillus present. He did not know what was meant by the term "liver-milk" which occurred frequently in the analyses. The main difficulty in analyses of water was their interpretation and the analyses had not been seen by a bacteriologist of special experience. They were drawn up more from a chemical than a bacteriological point of view, though the latter was the more important as regards health.

Dr. Suckling agreed that a standard of not more than 100 colonies per c.cm. was aimed at in a water-supply, though that figure by itself would not greatly affect his opinion of a sample. Mr. Gates drew his attention to the report on the sample taken on Oct. 29th, in which there were 230 colonies per c.cm. and coliform bacilli were present in 10 c.cm.

Mr. Gates: Do you think any responsible analyst ought to make the comment on that: "This water is a good water, but I think the chlorinator should be used as a precaution"?—I do not agree with the description of it as a good water.

If you had received that sample, and were reporting on it, what would you have put at the bottom of the analysis?—I should have regarded it as polluted water.

You would not have recommended chlorination as a precaution, would you? You would have said "It must not be put into supply until chlorinated"?—Certainly.

In reply to Mr. Gourley, Dr. Suckling said that to render such a water potable he would have advised chlorination at from 0·15 to 0·2 per million. A dose of 0·05 per million was too small. In a neighbouring water-supply with which he was familiar, the water was first chlorinated at 0·15 to 0·2 part per million and then softened by Clark's process. Rapid filters could not be relied upon to remove bacteria.

Dr. Suckling thought that where an alternative supply was available a well should be put out of service while work was going on underground, but in this case the Stroud Green well would not have been adequate to maintain the supply. Since Nov. 4th, when the Addington well was shut off, the high-level supply had been supplemented by boosting from the low level, necessitating the installation of special pumps and the taking of more water from the Metropolitan Water Board. He agreed that no carrier should be employed by a water undertaking, and that it would be prudent before taking a man on to inquire whether he had had typhoid, and if he had, not to employ him until tests had shown that he was not a carrier.

Later, in reply to Mr. Gates, Dr. Suckling said that in his opinion early warning to the public and inoculations might have been of value in preventing secondary cases. On the following day (in reply to Mr. Lyons) he said that where there were known to be even a few cases of typhoid in a neighbourhood every person with vague illness should be suspected of having it until it had been excluded. It would be of no special assistance in diagnosis to know that a patient had been drinking water which was contaminated with typhoid.

DR. SUCKLING RE-EXAMINED BY COUNSEL FOR DR. HOLDEN

Replying to Mr. Sandlands, Dr. Suckling agreed that at the beginning of an outbreak it was impossible to say whether the cause was more likely to be milk or water.

Mr. Sandlands: From August 20th, 1936, until and including Sept. 29th, 1937, the Addington distribution main is examined no less than twelve times. . . . On no occasion is there *B. coli* in 100 c.cm. McConkey, although in the analyses of the wells you find *B. coli* in 6 out of 19 in Stroud Green, and in 8 out of 18 in Addington well. Bearing that in mind . . . and knowing by what you are told from the borough engineer that chlorination is in progress at each of the four wells, you would be very slow to suspect water alone when you have four cases notified, and two more suspected in hospital?—On those assumptions, yes.

DR. SUCKLING RE-EXAMINED BY COUNSEL FOR THE CROYDON CORPORATION

Referring to the Bournemouth outbreak, where typhoid organisms in water infected milk, Dr. Suckling explained that whereas bacteria die in water they multiply in milk, so that a small infection of milk may give rise to a widespread epidemic.

On the question of carriers, Sir Walter Monckton quoted from a report of the Medical Research Council that 61 per cent. of chronic typhoid carriers in the German army had been found to excrete the organisms in both urine and fæces. Dr. Suckling agreed that a carrier working in a well, even though he obeyed instructions with regard to coming to the

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surface to defæcate, might convey infection to the water by his hands or clothing.

The presence of *B. coli* in a water sample indicates, said Dr. Suckling, either sewage or manurial pollution, but does not differentiate between them. The latter is of no importance in causing typhoid. Water which contains *B. coli* in 0·1 c.cm. may be described as highly contaminated, though milk containing *B. coli* in 0·1 c.cm. would be a high-grade milk. Until recently water from chalk supplies enjoyed a high reputation for purity, passage through chalk being thought to provide filtration, but this is now known to be erroneous. It was impossible to lay down a strength of chlorine required to apply to all water-supplies, as the amount of chlorine which different waters absorb varies widely. Adequate purification at Addington could be obtained by filtration and chlorination at 0·4 part per million. Even if samples of water were taken two or three times daily there might still be a risk of infection reaching a supply. Where a well had a chequered history and there were potential sources of pollution the necessary steps by way of filtration and chlorination had to be taken.

In Dr. Suckling's opinion the fever hospital which had been at Addington during the war could have no possible bearing upon the present outbreak.

Mr. Lyons: If four or five men urinated in the same bucket and one of them was a carrier . . . might the spilling of a teaspoonful from this bucket into a water-supply infect a whole area ?—Dr. Suckling: Yes, if it contained typhoid bacilli.

Dr. Holden Recalled

In answer to Sir Walter Monckton Dr. Holden said that he had made inquiries where there had been more than one case in a family, and, except in one instance, he thought that the infection was probably primary in all members of the family.

Sir Humphry Rolleston asked whether some examples of very long incubation periods may not be due to a primary attack passing unnoticed and a relapse being regarded as the first onset. Dr. Holden said that he had had one definite instance of this. Sir Humphry also asked Dr. Holden when he would say that the present cases became an epidemic. Dr. Holden said that he first began to be concerned on Oct. 30th when he knew of six cases which were all in different families and different parts of the town. It was then that he started very seriously to wonder what was going to happen.

In cross-examination by Mr. Lyons Dr. Holden said that he first discussed matters with Mr. Boast, the borough engineer, when he met him at Mr. Rimington's house on the afternoon of Oct. 31st. He did not know that Mr. Boast had telephoned to Mr. Brandram-Jones at Brighton that evening and found out that the water at Addington had not been chlorinated for the past month until Mr. Boast had called on him at about 10 P.M.

Mr. Lyons: And what did he say to you about this matter—"I have just telephoned to Mr. Jones and what do you think, this water has never been chlorinated for the last month" ?—I cannot remember what he said now.

But you realise the prime importance of that communication, do you not ?—We did realise the seriousness of that information, yes.

Mr. Lyons: This was the first information you had of what you will agree is a highly vital piece of news ?—It was the first information I had.

Mr. Lyons: Which came, of course, as a complete thunderbolt to you ?—It came as a surprise to me.

Mr. Lyons: Did you at once, when you got the communication, connect the position and say, "Well, here is the avenue that has to be approached" ?—I did not.

Dr. Holden agreed that Mr. Rimington had written to him on Oct. 29th saying, "The milk supplied in all cases is not the same; shell-fish and watercress have not been partaken of; the only common thing appears to be water." The matter had not been allowed to rest; he was following up every source of information that he could find. On Oct. 31st Mr. Boast said that he had telephoned to Mr. Jones at Brighton and found out that chlorination at Addington had not been continuous. Dr. Holden had said that if that were the case, as a measure of precaution, he had better start again. It was not until Nov. 15th that he had learned that men had been working down the well.

Mr. Forbes asked Dr. Holden whether it had occurred to him to confer with the local medical and panel committee. Dr. Holden replied that he had had very little to do with this committee, and did not know what it constituted.

Asked by Mr. Sandlands whether as the result of the evidence that he had heard and the inquiries that he had made he could suggest the source of the present infection, Dr. Holden said he thought the source of the outbreak was water from the Addington well infected by the man who had been found to be a persistent carrier of the fæcal type working down the well. This did not necessarily imply any wilful misconduct on the part of the man, as the possibilities of accidents in an adit with a bucket, hurricane lamps, and so forth were numerous. If the normal chlorination had been in force it would have been sufficient to have killed any typhoid bacilli which had got into the well.

Evidence of the Town Clerk

In reply to Mr. Forbes, Mr. Ernest Taberner, the town clerk of Croydon, said that the corporation were in favour of the fullest coöperation between the local medical practitioners and the public health services. Asked whether the corporation were in favour of the coöption of doctors on the public health committee, Mr. Taberner said that the corporation in their standing orders had decided not to exercise their right of coöption except with regard to such statutory committees as the maternity and child welfare committee.

Mr. Gourley said it had been suggested that the M.O.H. should coöperate with one or other medical bodies in the town, but he took it that it would not be considered right that a matter of this sort should be handled by a committee. There must be one captain on the bridge, and the corporation would look to the M.O.H. to be the man on the bridge. Mr. Taberner replied that the ultimate responsibility must rest with the M.O.H. If a committee had been in existence he doubted whether it could have told him anything that he did not already know or could find out from a standard text-book.

Mr. Forbes said the suggestion now was not that the local doctors might have assisted the M.O.H. but that he might have assisted them.

This concluded the evidence called by the corporation.

Evidence on Behalf of the Typhoid Outbreak Committee

In his opening remarks Mr. Lyons said he had suggested that the M.O.H had circulated in his report a statement that the water was good and there was no cause for alarm, when he ought to have known that he should have added "This water is being sterilised because of the apprehensions I have." He wished to make it perfectly clear that there was

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no suggestion that Dr. Holden had deliberately composed something that was false. He proposed to call evidence as to what happened at the meeting on Oct. 31st.

Mr. R. L. Moss, a resident in South Croydon, said he attended a meeting at a private house on Oct. 31st when the M.O.H., the borough engineer, and some 40 local residents were present. Mr. Moss had had some experience with typhoid in India. He had asked Dr. Holden whether he thought that water was a possible source of infection, and Dr. Holden had replied (to his amazement) that in his opinion it was inconceivable as the water had been tested. Dr. Holden had said that he had eliminated milk as a cause and was concentrating on food. Asked whether he had told local doctors about the outbreak, Dr. Holden had said that he had not notified them, nor told them about the symptoms to look out for, but that he thought it would be a very good thing to do. Mr. Moss had suggested that the inhabitants should be advised to boil their water, either by means of the B.B.C., the press, or cinemas, but Dr. Holden had opposed this as it would create a scare.

Sir William Willcox Examined

Sir William Willcox, senior medical adviser to the Home Office, examined by counsel for the Typhoid Outbreak Committee, said he had personally seen 16 of the Croydon typhoid cases at the London Fever Hospital, of which he was senior physician. He would regard the present outbreak as a serious one and the mortality-rate which looked like being about 15 per cent. as fairly high. In the Dardanelles and Mesopotamia typhoid was due to flies, dust, and such things, but in England the common causes were water and milk.

Mr. Lyons: Will you tell the tribunal what is your view upon the closest collaboration that should take place between the medical officer of the district and the local medical practitioners?—I think it is most important that one should have close contact and close liaison between the M.O.H., the municipal authorities, the general practitioners, and a group of doctors of the voluntary hospitals. . . . Now, I am not criticising the M.O.H. of Croydon (far be it from me to come here and do that) but I do criticise the machinery which exists throughout the whole country to-day. . . . There should be some ad-hoc committee representing the medical practitioners of the district which can advise the M.O.H. if called upon and which can be, in turn, helped by the M.O.H. . . . It is easy to say that the general practitioner does not know much about public health. Perhaps he may not, but he is the first one to establish contact with the patient and the patient's family; the first one who can put in simple language to the public the dangers they are exposed to and the precautions they should take.

Sir William said he had seen the circulars sent to local doctors on Nov. 1st and 4th, but he would like to see closer contact than that between medical practitioners and the health authorities. A number of points might usefully be discussed by the M.O.H. with local doctors at the beginning of an outbreak such as this: the advisability of boiling water, the earliest signs to look out for, and blood tests. Leucopenia was a very suggestive sign and was present in the first two or three days. A positive blood culture might be obtained on the third or fourth day. These were matters which might have been discussed by the M.O.H., who should act as a sort of supreme adviser to local doctors.

Asked about prophylactic inoculation, Sir William said that the advisability of this must be decided on each individual case. He would not advise it during the incubation period, but if one could be certain that a person had been free from any chance of infection for three weeks, one could give prophylactic inoculation with advantage.

If the public were instructed in the way in which typhoid infection was spread you would not have alarms and scares about the danger of shopping in or visiting the district.

Sir Walter Monckton (counsel for the Croydon Corporation) read an extract from the report of Judge Cotes-Preedy on the typhoid outbreak at Bournemouth and Poole:

"It is common knowledge that sporadic cases of typhoid fever frequently occur all over this country, and in my view the officials of the boroughs would have acted unwisely if, directly cases of illness suspected to be paratyphoid or perhaps typhoid had appeared, they had sponsored an alarmist press announcement of an existing typhoid epidemic . . . had such a pronouncement been made before the precise nature and source of the disease had been determined, a hasty flight of people away from the district carrying the disease to all parts of the country might have occurred, thereby preventing the localisation of the trouble."

Sir William agreed that this report would be known to the M.O.H.

Sir Walter Monckton suggested that if the M.O.H. wanted advice he should turn to the Ministry of Health.—Sir William agreed and said that from the scientific point of view the diagnosis in this case of the cause of the outbreak was very quickly made. His criticism was that there was rather a lack of liaison between the general practitioners and the M.O.H. in dealing with the problem which had eventuated from the infection. The letter sent to doctors on Nov. 3rd telling them that a few cases of typhoid fever had occurred in the district was all right as far as it went.

In reply to Mr. Sandlands, Sir William said this epidemic was rather sprung upon Dr. Holden and perhaps he did not realise the help that an ad-hoc committee of local practitioners might have given him.

Later, in answer to a question by Sir Humphry Rolleston, Sir William said that from reading the evidence he favoured the view that the Addington well was infected by sewage in the area surrounding the well which had been contaminated by a carrier, the germs reaching the water by percolation through the chalk. He thought this more likely than that the infection should have been due to a carrier working in the well.

Sir Humphry also asked whether Sir William knew of any examples of a standing medical committee existing to advise the M.O.H.—Sir William said there were committees in Manchester and Liverpool and several other big cities. He did not suggest that power should be taken from the M.O.H. and given to the committees; the M.O.H. must remain at the head of public health matters, but no one man can advise on the many little difficult details which arise in an epidemic, and he thought that he might have been greatly helped, greatly supported, and greatly relieved in his responsibilities by having a strong ad-hoc committee to advise him.

(When the inquiry reopened after the luncheon adjournment Mr. Murphy pointed out that when he had asked Sir William Willcox for his opinion of the cause of the outbreak they had all assumed he knew that a carrier had been working in the well. Actually no evidence had so far been called to show that this man was a carrier, and Sir William's opinion was therefore given without that knowledge.)

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Evidence of the Medical Officer from the Ministry of Health

Before Dr. E. T. Conybeare was called Mr. Murphy said he would carry out his examination himself, so that he would be nobody's witness. It would be as well to avoid questions of opinion as to where blame should be allotted as the impression might be created that Dr. Conybeare was expressing the judgment of the Ministry of Health.

Dr. Conybeare said he went to Croydon on Nov. 3rd to confer with Dr. Holden. He attended a meeting on his arrival at which the M.O.H. and the town clerk were present. After this Dr. Holden told him frankly that he was puzzled regarding the causation of the cases. A map was obtained from the borough engineer from which it appeared that eight of the nine cases were in areas apparently supplied by the high level system. He had been shown the recent analyses of the water and had suggested that samples should be taken from the two high level wells and sent to Dr. W. M. Scott at the Ministry. He was told that chlorination had been in force since Nov. 1st, purely as a precaution. The following day he returned to the Ministry and while he was there Dr. Scott rang up to report on the two samples he had been sent, which showed that the Addington well was heavily contaminated. He returned to Croydon and urged that the supply from the Addington well should be cut off and an extra point of chlorination introduced at the outlet from the reservoir. That afternoon, Nov. 4th, he visited the well and understood from the borough engineer that no fresh adits had been driven in it lately. On the 5th he visited two schools in the neighbourhood and inquired for an illness which often occurs within 72 hours of the ingestion of typhoid germs—namely, vomiting or diarrhœa. This may be due to the ingestion of colon bacilli or other sewage organism, but is sometimes useful in indicating when the infecting material has been consumed. In the two schools he obtained records of 19 such illnesses, of which 15 occurred between Oct. 19th and 28th. None of these cases had since developed typhoid. The information at the schools strongly supported the view that the infection was water-borne. The ramifications of the water-supply were so complicated that an engineering inspector from the Ministry had been sent down and Dr. Conybeare had visited all the wells and the reservoirs with him and Dr. E. L. Sturdee on Nov. 8th. On that day Dr. Scott had reported that he had been unable to isolate the typhoid bacillus from the water samples. He had advised that a special consultant should be called in by the corporation to advise on the water, and Dr. Suckling had arrived for this purpose on Nov. 9th. On Nov. 12th he had first heard from the engineering department of the Ministry that work had been going on in the Addington well for some time up to Oct. 28th. On the 13th he had obtained details of this work from Mr. Ellis, the mechanical superintendent, and the names of the 18 workmen engaged upon it. On Nov. 15th he had interviewed all these workmen and obtained a medical history and a sample of blood from each. As a result of the tests of these blood samples four men were sent to the Mayday Hospital during the following week for investigation of their urine and fæces. In one of these, "Case A," five specimens of fæces had been examined and all had proved positive for typhoid bacilli, but 12 specimens of urine had all been negative. None of the specimens from the other workmen had been definitely positive. On the 19th he had inquired into the question of watercress and had found that this could not possibly have entered into the causation. On Dec. 1st he had received bacteriological reports upon a large number of samples from the gathering ground, the Addington well, the reservoir and its neighbourhood and the supply distribution. None had shown typhoid bacilli.

Asked whether with the knowledge that he now possessed he could say that the probable cause of the infection was the known carrier in the well or some unknown carrier who might have polluted the gathering ground, Dr. Conybeare replied:

"I think that the coincidence between the dates on which this man was working in the well and the probable dates of infection in the majority of cases is no less remarkable than the coincidence between the distribution of the cases in the high level water-supply. On that ground I do regard it as the most likely probability that he was in fact connected with the outbreak, though not the cause of it in the gross manner which has been indicated."

Counsel's Concluding Statements

FOR THE CROYDON LOCAL MEDICAL AND PANEL COMMITTEE AND THE CROYDON DIVISION OF THE BRITISH MEDICAL ASSOCIATION

Mr. Forbes said that in the critical attitude of the Croydon doctors there was nothing in the nature of an attack on the medical officer of health. It was apparent to everybody that Dr. Holden was a loyal, able, and industrious servant of the corporation and in the witness-box a truthful and careful witness. But the question was bound to come up how far coöperation between medical officer and practitioners was sufficient and satisfactory and why there had been no more in the way of conference between them, and the practitioners thought it far better for their comments to reach the tribunal direct and, as he put it, chlorinated to their own standard. There had been in fact no consultation with any committee in the early days and local practitioners had wondered why. In its issue of Nov. 27th, 1937, the *Medical Officer* had said "We submit, rather we proclaim, that it is neither usual nor useful for the medical officer of health in times of urgency to confer with representatives of the local medical profession." Dr. Holden, asked if he subscribed to that, had replied that if a local committee had been available he would have been happy to have accepted and to have sought their help, subject to the consent of the public health committee. But he took what Croydon practitioners regarded as a narrow view. There being no such standing committee at the time of this outbreak he did not think there was any way in which he could help practitioners by meeting them in conference. Mr. Forbes submitted that Dr. Holden could not have found a better committee to coöperate with than the local medical and panel committee. They were now prepared to set up any standing committee which the corporation would recognise. According to the town clerk the corporation would now consider coöpting practitioners upon the public health committee. Referring to a resolution passed by the monthly meeting of the Croydon division of the B.M.A. Mr. Forbes said the local doctors did not now want to complain either that Dr. Holden did not send a letter to more than 26 doctors on Nov. 1st, or to more than 140 on Nov. 4th. He was in difficulties and was feeling his way.

FOR THE SANITARY INSPECTORS

Mr. Talbot submitted that if the theory was accepted that infection was communicated by a workman in

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the well, and disseminated because the water was not then chlorinated, no responsibility could attach to the sanitary inspectors. There had been criticism of the camping site, but in the last resort the only possible way of getting rid of it was by proceedings for nuisance, and as far as they knew the ground was carried on in a perfectly proper manner. The only danger to health would have arisen not from anything done on the site but by reason of the fact that the prosecutors had a well some distance off. Cutting off the water was a matter of policy for the corporation to decide. The making of cesspools could not be prevented under existing law if no sewer was available. They could only be dealt with by sanitary inspectors if they overflowed or leaked, and there was no evidence of that kind except at the Addington Lodge farm where apparently the effluent from the cesspool had only penetrated a few feet into the ground. The latrine at the open-air school was under the jurisdiction of the education authority. Contamination of the water-supply being discovered, it had been suggested that the sanitary inspectors did not soon enough warn the inhabitants to boil their water, but, on the weight of evidence, infection took place during September and October and had ceased by Nov. 1st, on which day the water began to be chlorinated and in those circumstances it would have done no good to boil the water. Complaint had been made that warning was not given to empty storage tanks in unoccupied houses, but the typhoid bacillus had a very short life in water and nobody in fact had contracted the disease from that cause.

FOR THE CHIEF WATER ASSISTANT

Mr. Dingle Foot began by submitting that the evidence had not definitely excluded the reservoir as the source of infection. Mr. Brandram-Jones had been in the service of the corporation from September, 1935, until Oct. 16th, 1937. He succeeded Mr. Ord as chief water assistant but owing to Mr. Ord's fatal illness was not able to take over personally from him. Nothing in his training had made him familiar with chemistry or bacteriology. When employed by the Metropolitan Water Board he had no responsibilities for chlorination. The nature and extent of his duties were determined from time to time by the borough engineer. As regards taking of samples, he continued the system which he found in operation, the sampling being done by Mr. Ringham in the way prescribed by the Ministry of Health. His analyses were presented each month to the medical officer, the borough surveyor, and the water committee, and if instructions were not being carried out the surveyor had every opportunity of discovering the fact. No explicit instructions had been given him to increase the number of samples—at any rate he had no recollection of receiving any. How then did the misunderstanding arise as a result of which no sample was taken of the low water in Addington well from April till October, 1937? Actually Mr. Ringham had wrongly supposed that he was absolved from taking them from the well and took them from other wells thereafter. Mr. Brandram-Jones was not alone in omitting to notice what had happened. On the principal question, that of chlorination, Mr. Dingle Foot recalled that up till July, 1936, Addington had been chlorinated for one or two days each month and that other wells had not been chlorinated at all. Until then the official view was rather against chlorination; for the improvement after July, 1936, Mr. Brandram-Jones was largely responsible. In the summer of 1936 he was in touch with the M.W.B. examination department about the chlorination and discussed the correct dosage with Dr. Holden.

As regards chlorination before September, 1937, Mr. Dingle Foot summarised the position in this way: (1) In July, 1936, Mr. Boast and Dr. Holden agreed in Mr. Brandram-Jones's hearing that the normal dose should be 0·05 part per million. (2) Mr. Boast and Dr. Holden agreed that when there was any reason for special precautions this dose should be stepped up, and this was done on two occasions. (3) Mr. Brandram-Jones had been led to suppose that the practice of keeping the chlorination plant running at 0·05 part per million was not as a safeguard but simply in order that an effective dose could be given at once if desirable. Mr. Dingle Foot submitted that it had not been suggested by any witness that Mr. Brandram-Jones had ever been told that he must keep the chlorinator working continuously, so that he had not been guilty of any breach of specific instructions.

On Sept. 16th Mr. Brandram-Jones and Mr. Ellis had made the discovery after careful inspection of the lay-out of the pipes at Addington that it was not possible, with both engines working simultaneously, to pass any of the water through the filters. In their subsequent interview with Mr. Boast they supposed they had made the position clear to him and that he realised that working both engines would mean cutting out the filters. He did not suggest that cutting out the chlorinator was ever mentioned at that interview, and there was no doubt that Mr. Boast did not realise that this was involved in cutting out the filters. In view of the close connexion between them, however, it was a reasonable conclusion to draw that anyone who authorised those under him to do the one was also authorising them to do the other. Mr. Brandram-Jones's attitude to chlorination was guided by the analyses. In 1936 these had given cause for alarm, and in August he had stepped up the dose of chlorination; but in August, 1937, the position was entirely different and the reports on the samples from all the wells in that month had been uniformly satisfactory.

With reference to the use of a bucket by the workmen for urination while down the well, Mr. Dingle Foot suggested that it was possible that the men might not have appreciated that the instructions they received to come to the surface in order to use the lavatory referred to urination at all. Seeing that coming to the surface involved an extremely unpleasant journey in a barrel which had already caused the death of one man and took some 12 minutes, there would be a strong temptation to disobey instructions and use the bucket in the adit. In any case every possible care had been taken in using the bucket and in carrying it up in the skip. Dr. Conybeare did not think that the infection could be attributed to spilling urine in the well, so that if every workman had come to the surface for urination the result would have been the same. He hoped the tribunal could come to the conclusion that Mr. Brandram-Jones and Mr. Ellis had faithfully carried out the instructions which had been given to them by those in authority.

FOR THE BOROUGH ENGINEER

Mr. Thesiger, who appears for the borough engineer, said it must not be lost sight of that Mr. Boast was primarily the borough surveyor, and that his academic knowledge of water had to be combined with knowledge of many other subjects—architecture, street-planning, drainage, and the like. Medical knowledge

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or the danger of the urination or excretion of a carrier were not likely to be present in his mind. Mr. Thesiger wondered whether it did not seem that the water undertakings of an authority should not be controlled by a specialist. It was a matter of more than engineering; some knowledge of bacteriology might well be desirable. Mr. Boast had taken over his duties in 1935 from Mr. Carter who had had experience of the wells of Croydon for 30 years, and he had not been warned to keep any special eye on the Addington gathering ground, and at that time chalk water-supplies, as Dr. Suckling had said, enjoyed a good reputation for purity. The farms on the gathering ground had been there for many years. As regards cesspools on the gathering ground, only six new houses had been built there since 1931 and in each case their cesspools had been properly supervised and made according to the by-laws of the corporation. Mr. Boast had carried on the system of monthly analyses which had been the practice for many years. He had inherited a system under which very little chlorination had been practised at all, and it was only because in 1936 the M.O.H., Mr. Boast, and Mr. Brandram-Jones had started the practice of chlorination and had introduced more modern instruments at the pumping stations that the omission of chlorination at any time had become noticeable. In November, 1936, Mr. Boast had said, in reply to a memorandum from Dr. Holden: "I am arranging in future, in addition to test analyses of the raw water, for the actual water put into the mains to be analysed after chlorination." In introducing this change, Mr. Boast was not meaning to drop the testing of the raw water, but was introducing an improvement on the pre-existing practice. If the testing of the raw water had been continued once a month at each well, there was no evidence that anything would have come to light with regard to infection by a carrier in October, 1937, in time for anything to have been done.

In the matter of the instructions about the work which was to be done in the well there was a difference in the recollection of Mr. Boast and Mr. Brandram-Jones, but there was no doubt that the instructions to pump to waste while the men were in contact with the water, to pick men who appeared to be physically fit, and to wear special clothing had been carried out.

Coming to the final matter on which he anticipated that some criticism might be made of Mr. Boast, the question of the cessation of chlorination, it was quite clear that on Oct. 31st Mr. Boast, who had been left without a water assistant since Oct. 16th, was under the impression that chlorination was proceeding at Addington, and the purpose of his telephone conversation with Mr. Brandram-Jones had been to find out the dosages being used for the high- and low-level supplies. He had told Dr. Holden with surprise that evening that in fact there was no chlorination at Addington, and, although at the time this did not seem to be a vital matter, it had been attended to with promptness and the very next day arrangements had been made to put in a new chlorinator to catch the water as it went into supply.

Mr. Murphy asked how it was that, when Mr. Boast knew that chlorination had stopped at Addington, a bacteriological examination of the Addington well water had not been done until Dr. Conybeare appeared on the scene on Nov. 3rd. Mr. Thesiger replied that at that time it had not occurred to Mr. Boast to connect up the absence of chlorination with the typhoid cases, and a sample had been taken on Oct. 29th, on which a report was being awaited; he would not have thought that the taking of another sample could produce any quicker result. The importance of the fact that men had been working in the Addington well had never occurred to Mr. Boast.

"We all know now," said Mr. Thesiger, "that one touch from the soiled hand of a man on the brickwork to which the water was rising may have caused this infection, and I ask you to say that that, clearly, on the evidence, was never present in Mr. Boast's mind."

Mr. Murphy remarked that the true answer to his question might well be that water was not suspected until Dr. Conybeare arrived.

FOR THE MEDICAL OFFICER OF HEALTH

Mr. Sandlands said he was not concerned with the question whether there should be a statutory obligation on all local authorities to start medical committees. Dr. Holden had said that if a committee had been in existence he would gladly have coöperated with it, but he did not see how he could call one together in the middle of an outbreak. He proposed to deal with the possible causes of the outbreak and to inquire whether Dr. Holden could be blamed for any of them; then to ask whether he had taken all the steps he ought to localise the trouble quickly. A medical officer of health had various statutory duties but these did not include looking after the water department. According to the regulations of 1935: "He must inform himself as far as practicable as to all matters affecting or likely to affect public health in the district, and be prepared to advise the local authority on those matters." The phrase "as far as practicable" must mean: "Put yourself in the circumstances of the medical officer of health in that particular place, see what his predecessor has done, see what he has been asked to do, and see what in fact he has done." When in 1933 the Ministry of Health had inquired into the duties of the M.O.H. in Croydon they had never suggested that he was under any obligation to carry out any water duties. Dr. Holden had said that his duty was to keep his eyes open and inform himself generally of the position. From time to time he had inspected the gathering grounds and had made recommendations to the borough engineer. In Croydon, at any rate, the engineer was the senior officer.

The most likely cause of the outbreak, Mr. Sandlands submitted, was infection of the water in the Addington well by a carrier. How was Dr. Holden to be held responsible for that? He did not know that work was being done in the well; he did not know under what conditions it was going on, and no one had thought of asking him whether they should work without chlorination in September and October. It was an unhappy chapter of accidents for which no one could be blamed. Nobody until this case appeared to have heard of having a medical test of men working in a well. Dr. Suckling had said that it would be a good thing in the future to ask men if they had had typhoid, but he had not heard of any instance where it had been done in the past.

Passing to the gathering grounds, Mr. Sandlands said that the camps either inside or outside the borough had never been brought to Dr. Holden's notice. It was unlikely that anything would get to the well from the manure heap at Fisher's farm, and if it did it would be harmless because it was from animal and not human excreta. Dr. Holden had said if there had been a case of typhoid at this farm it would have been a point of danger which he would have watched very closely. If there had been such a case it would have been taken to hospital and all

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kinds of precautions would have been taken, and no doubt a heavy dose of chlorination would have been put into the well. Until October, 1937, there had been no power for the local authority to connect the drains from the farm to a sewer. Now, under the Act of 1936, there was such power and, as a precaution, it had been done.

With regard to cesspits, Dr. Holden had said that the sanitary inspectors kept an eagle eye on them, and there had been no complaints. Referring to the latrine at St. Giles' School, which Dr. Suckling had regarded as the most likely potential source of infection from the gathering ground, Dr. Holden had said: "If I had known that the thing was there it would not have been allowed to remain." Mr. Murphy interposed to say that this latrine was certainly a potential menace, being almost directly over an adit. Even the borough engineer did not know it was there, Mr. Sandlands remarked. The school belonged to the education department and they had entrusted the work to a contractor. With regard to any of these potential sources of infection, he submitted, Dr. Holden could not be held to blame, and, even if the tribunal found that all of them had contributed, the governing answer was that Dr. Holden believed that chlorination was in progress.

The analyses from August, 1936, until Oct. 29th, 1937, had not shown that the water required any treatment other than it was then getting. Thereafter Dr. Holden, far from doing anything wrong, had done the best thing possible. The question of flies had had to be investigated, laundries communicated with, and Dr. Holden had even, at the request of local doctors, visited fifty patients in their homes. This showed the great thoroughness of his work and the cordial coöperation there was between him and the local doctors.

FOR THE SOUTH CROYDON TYPHOID OUTBREAK COMMITTEE

Mr. Lyons said that in Croydon there was a water committee and a public health committee which dealt with specialised subjects, but no chairman or member of these committees had thought fit to come to the inquiry and volunteer information. "Is it the duty of any responsible person," Mr. Lyons asked, "either as chairman or vice-chairman or member of a public body to say that he or she will accept whatever honour and authority that office may give, but yet will not accept any responsibility for the paid officers of the department or for any errors, inaccuracies, or neglect?" The chairman of these committees, said Mr. Lyons, had paid no attention whatever to what was being done by their employees. It had been urged on behalf of the borough engineer that he had many offices and a lot of work to do. What were the local authority doing in appointing a man who knew nothing about the real work in the direction of water-supplies? Was it fair for Dr. Holden and Mr. Boast to be summoned to the inquiry, and for the local authority who appointed them to run away and say that it was no business of theirs? There was, Mr. Lyons maintained, clear evidence of absolute non-coöperation between these two officers—not the slightest attempt to get together to realise the dividing lines of their respective offices and where those lines converged. Between two stools no one seemed to have cared where the public interest fell.

FOR THE CROYDON CORPORATION

Sir Walter Monckton said the local authority had put before the tribunal all the information at its disposal. He took entire responsibility for the fact that certain persons to whom Mr. Lyons had referred had not gone into the box. The public health and water committees had accepted the recommendations of the responsible officers, but they had no wish to shelter behind them. There was obviously a moral responsibility on the committees and on the local authority which he hoped no word of his had sought to avoid.

Sir Walter replied to two questions put by Mr. Murphy. (1) Were the corporation slow in not tackling the whole water-supply problem between Oct. 29th and Nov. 3rd? (2) If slowness were attributable had it any effect on the outbreak and its extent? He recalled Sir William Willcox's view that the cause of the epidemic was discovered very quickly and that from a scientific point of view the diagnosis was quickly made. If it was true, as he believed, that infection had reached each person by Nov. 1st, it was more material to look at the period Oct. 30th to Nov. 1st and then it could hardly be contended that Dr. Holden was slow in looking at the water-supply. Even should the tribunal attribute to him some slowness there was nothing to show that any case of typhoid resulted from it. In the matter of chlorination Sir Walter reminded the tribunal that it was first introduced in the borough in 1936 when there had been some adverse analyses; it was not regarded as something permanent but as something to be used for a specific purpose when the analyses were bad.

Close of the Inquiry

When the inquiry ended on Wednesday morning, after sitting for 17 days, the chairman, Mr. Murphy, said that a report would be presented with the least possible delay.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 1ST, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2383; diphtheria, 1417; enteric fever, 34 (23 "expected"); pneumonia (primary or influenzal), 1648; puerperal pyrexia, 163; cerebro-spinal fever, 35; acute poliomyelitis, 6; encephalitis lethargica, 1; dysentery, 247; ophthalmia neonatorum, 104. No case of cholera, plague, or typhus fever was notified during the week.

It should be recalled that all these figures are artificially enhanced by the incompleteness of returns in the previous (holiday) week.

The number of cases in the Infectious Hospitals of the London County Council on Jan. 7th was 4205, which included: Scarlet fever, 806; diphtheria, 1474 (diphtheria carriers, 30); measles, 496; whooping-cough, 345; puerperal fever, 14 mothers (plus 12 babies); encephalitis lethargica, 283; poliomyelitis, 3. At St. Margaret's Hospital there were 20 babies (plus 10 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox, 7 (1) from enteric fever, 45 (7) from measles, 7 (0) from scarlet fever, 19 (3) from whooping-cough, 43 (8) from diphtheria, 72 (17) from diarrhœa and enteritis under two years, and 59 (10) from influenza. The figures in parentheses are those for London itself.

Six deaths from typhoid were reported from Croydon. Liverpool had 19 deaths from measles, Manchester 7, no other great town more than 2. Liverpool also reported 4 deaths from whooping-cough. Diphtheria was fatal in 26 great towns, Liverpool reporting 7 deaths; no other great town more than 2.

The number of stillbirths notified during the week was 237 (corresponding to a rate of 39 per 1000 total births), including 34 in London.

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PUBLIC HEALTH

Prevalence of Dysentery

THERE is again during 52nd week a reduction in the number of cases of dysentery notified. The return for 1937 is now complete and the notifications of dysentery in England and Wales during the 52 weeks of 1937 add up to 4025. Assuming, as seems likely, that the number of institutional cases has not changed greatly, and deducting (say) 400 from the total, in order to arrive at the figure for the extra-hospital population, we find (as was suggested on p. 1462 of an earlier issue) that the general prevalence throughout the country in 1937 was at least tenfold what it was in 1934, probably near twelvefold. In the week under review it is still the home counties which account for the majority of the reported cases, the figures being: London 77, Middlesex 22, Kent 13, Essex 12, Sussex West 9, Surrey 8; other counties still with unusual numbers to report being Devon 5 (scattered), Lancaster 10, Norfolk 19 (Norwich 17), Nottingham 13 (county borough), Oxford 6 (county borough), Somerset 8 (scattered), Stafford 10 (scattered), Wilts 6 (Swindon 5), Glamorgan 9 (Cardiff 7, Swansea 2).

NOTIFIABLE DISEASES DURING 1937

The Registrar-General's returns now being complete for the 52 weeks of 1937, we give the total numbers of certain infectious diseases notified in the 125 great towns (including London), and the proportion which proved fatal, with comparative figures for 1936.

Disease.	Cases.		Deaths.	
	1936.	1937.	1936.	1937.
Enteric fever ..	1,414	1,283	138	110
Small-pox	12	0	0	0
Scarlet fever ..	55,999	53,927	225	179
Diphtheria	34,529	38,266	1,705	1,603
Measles	—	—	1,896	617
Influenza	—	—	2,780	8,325

Measles and influenza not being notifiable the number of cases is not known.

OBITUARY

THOMAS TENDRON JEANS, C.M.G., M.B. Lond.

Surgeon Rear-Admiral Jeans, who died at Southsea on Jan. 4th in his sixty-seventh year, had spent 32 years of his life in the Navy, and he has left all that needs to be told of his life at sea in his "Reminiscences of a Naval Surgeon" published in the year following his retirement. Jeans qualified M.B. Lond. in 1893, entered the Navy in the following year, saw active service at Manila during the Spanish-American war, and as surgeon of *Monarch* was present with the Naval Brigade at Paardeberg and Bloemfontein; he gives a vivid picture of Cronje's laager after its surrender. Later he served in the flag-ship of the West Indian station, visiting Venezuela among other places; and when war broke out in 1914 he was on the East Indian station and went with the flag-ship to cover the landing at Gallipoli. Jeans retained to the end of his life a staunch love of the Navy, although he was critical of a system which he thought prevented the junior executive officer from exercising independent thought and sharpening his wits against those of others. Earlier in his life he had written a series of stories for boys about the Navy, including "Ford of H.M.S. Vigilant," "Mr. Midshipman Glover, R.N.," and "John Graham, Sub-Lieutenant, R.N." The last appeared in 1913 and he did not resume his service yarns when the war was over, as he felt that the prospects in the Navy were not then what he would have wished them to be. From 1919 to 1922 he was in charge of the Naval Hospital at the Cape and for some years before his retirement he was at the Plymouth Hospital. Jeans was made C.M.G. in 1919 for valuable services in various theatres of the war.

WILLIAM L. M. GABRIEL, M.B. Leeds, B.Hy. Durh.

Dr. Gabriel, who died on Dec. 30th, was 46 years of age and had been an assistant medical officer for Northumberland since 1920. He was a Yorkshireman, born at Keighley, and was a student at Leeds University at the outbreak of the late war. In August, 1914, he accepted a commission in the West Yorkshire Regiment as a combatant officer and went to France with the 2nd battalion early in 1915. A few months later he was badly wounded at Aubers ridge and during convalescence in England he was able to complete his medical studies at Leeds, graduating with second-class honours in 1917. After a short time as resident medical officer at the Leeds Public Dispensary, he took a commission in the Royal Army Medical Corps (Special Reserve) and became medical officer in charge of the Royal Army Ordnance Department at Chilwell. Joining the public health service of Northumberland after the war he acted as medical officer of health for the Gosforth urban district council from 1932 onwards, but at the time of his death had just resigned this appointment in order to take over the duties of senior assistant county medical officer. A colleague writes of the bright future that appeared to be in front of him, of his charm, his loyalty, and the devotion he gave to his work. In leisure hours this sense of service made him a keen territorial, and he succeeded to the command of the 149th Field Ambulance Brigade two years ago, later representing it at the Coronation and receiving the Territorial Decoration.

Dr. Gabriel leaves a widow with one young son.

GERMAN JOURNAL FOR RHEUMATISM.—Under the title of *Zeitschrift für Rheumaforschung* a journal will appear this year edited by Dr. P. Köhler (Bad Elster) and Prof. R. Jürgens and Dr. H. Kaether (Berlin), which will seek to collect and epitomise the many papers on rheumatism which are being published in Germany and elsewhere. The publisher is Theodor Steinkopff of Dresden.

NATIONAL INSTITUTE OF ECONOMICS AND SOCIAL RESEARCH.—Under this name an institute has been formed which will investigate problems of contemporary human society. Grants for the purpose have been made by the Sir Halley Stewart trust, the trustees of the late Lord Leverhulme, the Pilgrim trust, and the Rockefeller Foundation. Sir Josiah Stamp is to act as president, and Prof. N. F. Hall, who is head of the department of political economy in the University of London at University College, has been invited to become its first director. The offices of the institute are at 32, Gordon-square, London, W.C.1.

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MEDICAL NEWS

University of London

At recent examinations the following candidates were successful :—

M.D.

Branch I (*Medicine*).—John Apley, Univ. Coll. Hosp.; C. G. Baker, Guy's Hosp.; Jean M. Cass and Lynette Dowsett, Roy. Free Hosp.; E. A. Hardy, Westminster Hosp.; G. W. Hearn, St. Thomas's Hosp.; C. A. Lillicrap and W. N. Mann, Guy's Hosp.; S. K. Squires, St. Mary's Hosp.; and R. J. Vakil, St. Thomas's Hosp.

Branch II (*Pathology*).—D. G. ff. Edward, St. Bart.'s Hosp.

Branch IV (*Midwifery and Diseases of Women*).—T. L. S. Baynes, St. Bart.'s Hosp.; P. I. Boyd (University medal), Univ. Coll. Hosp.; and Anne A. Craig, Roy. Free Hosp.

Branch V (*Hygiene*).—Moses Sendak (University medal), St. Mary's Hosp.

The following have been recognised as university teachers at the schools indicated: Dr. P. M. F. Bishop, Dr. E. R. Boland, Mr. Kenneth Hooper, Dr. A. D. Marston, Mr. H. L. Messenger, Dr. C. Keith Simpson, and Mr. T. T. Stamm (Guy's Hospital); Mr. P. B. Ascroft (Middlesex Hospital); Dr. Thomas Tennent and Mr. W. N. L. Wade (King's College Hospital).

Applications are invited for the Geoffrey E. Duveen travelling studentship, of the value of £450, for research in any aspect of otorhinolaryngology.

The studentship is tenable in the first instance for one year, part of which must be spent abroad, but its tenure may be extended to allow the student to undertake research at the Royal Ear Hospital or elsewhere. Further particulars may be had from the academic registrar, University of London, W.C.1, to whom applications should be sent before Dec. 31st, 1938.

The annual conversazione of the university will be held on Thursday evening, March 17th. Tickets may be obtained from the clerk of convention at the University, W.C.1.

At 5 P.M. on Mondays, beginning on Jan. 17th, at University College, Gower-street, W.C., Mr. H. R. Ing, D.Phil., will give six lectures on chemical structure and pharmacological action.

Royal Institute of Public Health and Hygiene

On Wednesday, Jan. 19th, at 3.30 P.M., Sir Walter Langdon-Brown will give the first of a series of lectures on national health. He will speak on diet and the national health, and subsequent lectures will be announced week by week in our Medical Diary. All the lectures will be held in the lecture hall of this institute, 28, Portland-place, London, W.

B.M.A. Scholarships and Grants in Aid of Research

The council of the British Medical Association is prepared to receive applications for research scholarships and grants for assistance of research in connexion with disease.

Scholarships.—An Ernest Hart memorial scholarship (£200 per annum), a Walter Dixon scholarship (£200 per annum), and three research scholarships (each £150 per annum). These scholarships are given to candidates whom the Science Committee of the Association recommends as qualified to undertake research in any subject (including State medicine) relating to the causation, prevention, or treatment of disease. Preference will be given, other things being equal, to members of the medical profession. Each scholarship is tenable for one year, commencing on Oct. 1st, 1938. A scholar may be reappointed for not more than two additional terms, and is not necessarily required to devote the whole of his or her time to the work of research, but may hold a junior appointment at a university medical school, or hospital, provided the duties of such appointment do not interfere with the work as a scholar.

Grants.—Grants for the assistance of research in the causation, treatment, or prevention of disease. Preference will be given, other things being equal, to members of the medical profession and to applicants who propose as subjects of investigation problems directly related to practical medicine.

Application for scholarships and grants must be made not later than May 7th, on the prescribed form, a copy of which will be supplied on application to the secretary of the Association, B.M.A. House, Tavistock-square, London, W.C.1. Applicants are required to furnish the names of three referees who are competent to speak as to their capacity for the research contemplated.

Society for Constructive Birth Control

At a meeting of this society on Wednesday, Jan. 19th, at 8 P.M., at Manson House, 26, Portland-place, London, W., Dr. John Hannan will speak on the dangers of abortion.

Institute of British Surgical Technicians

On Friday, Jan. 21st, at 8.15 P.M., at the Welbeck Hotel, Welbeck-street, London, W., Mr. A. E. Mortimer Woolf will give a lecture on general abdominal technique. Tickets may be had from the secretary of the institute, 6, Holborn-viaduct, London, E.C.1.

Swedish Woman Professor of Medicine

Dr. Nanna Svartz-Malmberg has been appointed professor of medicine at the Stockholm Caroline Institute by the Swedish Government. This is the first time in Sweden that a woman has been appointed professor. Dr. Svartz-Malmberg is known especially for her work on the intestinal bacteria and their influence on rheumatic diseases.

The Film in Biology

Three lectures on this subject will be given on Thursdays, Jan. 27th, Feb. 3rd and 10th, at 5.15 P.M., at the Royal Institution, 21, Albemarle-street, London, W. Mr. T. H. Gillespie will speak on the king penguin, Mr. E. J. Salisbury, F.R.S., on plant life, and Mr. H. R. Hewer on embryology. Each lecture will be illustrated.

State Veterinary Service

The following appointments have been made by the Ministry of Agriculture and Fisheries in the new State veterinary service: Sir John Kelland, M.R.C.V.S., chief veterinary officer; Mr. D. A. E. Cabot, M.R.C.V.S., and Mr. E. C. Lloyd, M.R.C.V.S., deputy chief veterinary officers; and Captain W. G. Wragg, M.R.C.V.S., chief superintending inspector.

British Postgraduate Medical School

On Feb. 2nd, 9th, and 16th, at 4.30 P.M., Dr. Dorothy Russell will lecture at the school on the pathology of diseases of the nervous system, and on Feb. 4th, 11th, and 18th, at 2.30 P.M., Prof. Lambert Rogers will speak on surgery of the spinal cord and peripheral nerves. Four lectures on the hygiene of the new-born child will be given at 3.30 P.M. on Feb. 3rd, 10th, 17th, and 24th, by Prof. V. H. Mottram and Dr. Alan Moncrieff. Tickets may be had from the dean of the school, Ducane-road, London, W.12.

Society for Relief of Widows and Orphans of Medical Men

At a quarterly court held on Jan. 5th the president, Mr. V. Warren Low, being in the chair, two new members were elected and the death of one reported. A sum of £2183 15*s.* was voted for the payment of the half-yearly grants to the sixty-one widows and five orphans in receipt of relief. Three special grants each of 50 guineas per annum were made to three orphans, who had reached the age of 16 when ordinary grants cease, to enable them to continue their education. A first application for relief was received from the widow of a deceased member and she was voted £50 per annum from the ordinary funds and £25 per annum from the Brickwell Fund. Receipt of a further legacy (of £168) was reported from the executors of the late George Cattlin, bringing the total amount received from this source up to £4243. It was decided to celebrate the 150th anniversary of the foundation of the society by a dinner to be held in London on Saturday, Oct. 29th; the society was founded at a meeting held at the Gray's Inn Coffee-house on Oct. 29th, 1788, over which Sir George Baker, Bt., F.R.S., physician to King George III, presided. Membership is open to any registered medical man, who at the time of his election is residing within a 20-mile radius of Charing Cross. Particulars from the secretary at 11, Chandos-street, London, W.1.

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Medical Diary

January 17th to January 22nd

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY.
5.30 P.M., general meeting of fellows.
Pathology. 8.15 for 8.30 P.M.
Laboratory meeting at St. Mary's Hospital, W.
THURSDAY.
Dermatology. 5 P.M. (Cases at 4 P.M.)
Dr. H. MacCormac: 1. Chauffard-Still-Felty Syndrome. Dr. L. Forman: 2. ? Scleroderma. Dr. H. C. Semon: 3. Lichen Planus of the Tongue, Finger, and Toe-nails. Dr. G. B. Dowling: 4. Premycotic Erythema. 5. Acrodermatitis Pustulosa Hæmalis.
Neurology. 8.30 P.M.
Dr. H. G. Garland: Rôle of Trauma in the Pathology of Organic Disease (excluding Epilepsy).
FRIDAY.
Physical Medicine and Dermatology. 4.30 P.M.
Dr. H. W. Barber, Dr. Elizabeth Hunt, Dr. Kerr Pringle, and Dr. W. Yeoman: Skin Manifestations in Rheumatism.
Radiology and Obstetrics and Gynæcology. 8.30 P.M.
Dr. W. M. Levitt, Dr. J. F. Bromley, and Mr. Leonard Phillips: Radiotherapy in Non-malignant Gynæcological Disorders. Mr. Malcolm Donaldson, Miss Louisa Martindale, and Mr. L. Carnac Rivett will also speak.

HUNTERIAN SOCIETY.
MONDAY.—9 P.M. (Mansion House, E.C.), Dr. Gustav Singer: Functional Disorders of the Intestine. (Hunterian lecture.)

CHELSEA CLINICAL SOCIETY.
TUESDAY.—8.30 P.M. (Rembrandt Hotel, Thurloe-place, S.W.), Dr. James Davidson: The Work of a Forensic Science Laboratory.

NORTH LONDON MEDICAL AND CHIRURGICAL SOCIETY, Royal Northern Hospital, N.
THURSDAY.—9.15 P.M., Sir Walter Langdon-Brown: The Dead Hand in Medical Science.

SOCIETY OF RADIOTHERAPISTS, 11, Chandos-street, W.
FRIDAY.—5.30 P.M., Dr. N. S. Finzi and Mr. J. E. Roberts: Impressions of the Chicago Congress and of Radiotherapy in America.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Thornhaugh-street, W.C.
Maternity and Child Welfare Group.
FRIDAY.—8.30 P.M., Dr. Stella Churchill: Eugenics and Maternity and Child Welfare Work.

EUGENICS SOCIETY.
TUESDAY.—5.15 P.M. (rooms of the Royal Society, Burlington House, Piccadilly, W.), Dr. G. F. McCleary: Population Problems in the British Commonwealth.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, Manson House, 26, Portland-place, W.
THURSDAY.—7.45 P.M., Demonstration. 8.15 P.M., Prof. R. Brunel Hawes (Singapore): Acute Cardiac Beri-beri. Prof. R. A. Peters, F.R.S.: The Biochemistry and Physiology of B_1 Deficiency. Dr. B. S. Platt (Shanghai): Pyruvic Acid in Beri-beri.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland-place, W.
WEDNESDAY.—3.30 P.M., Sir Walter Langdon-Brown: Diet and the National Health.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck-street, W.
THURSDAY.—8.30 P.M., Dr. J. F. Brailsford: Paget's Disease of Bone, its Frequency, Diagnosis, and Complications.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.
MONDAY.—5 P.M., Mr. J. Cole Marshall: Surgical Treatment of Detachment of the Retina.
WEDNESDAY.—5 P.M., Mr. R. T. Payne: Cancer of the Stomach as a Surgical Problem.
FRIDAY.—5 P.M., Mr. R. C. Brock: The Pathology, Diagnosis, and Treatment of Intrapulmonary New Growths. (Hunterian lectures.)

UNIVERSITY COLLEGE, Gower-street, W.C.
MONDAY.—5 P.M., Mr. H. R. Ing, D.Phil.: Chemical Structure and Pharmacological Action. (First of six lectures.)

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
TUESDAY.—4.30 P.M., Prof. Arthur Ellis: Nephritis.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Mr. E. J. King, Ph.D.: Tests of Liver Function. 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Dr. Cuthbert Dukes: The Pathology of Calculous Disease of the Urinary Tract.
THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration. 3.30 P.M., Mr. J. Bright Banister: Cæsarean Section.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. C. Naunton Morgan: Diseases of the Rectum.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY.—10 A.M., Dr. Post: X ray film demonstration, skin clinic. 11 A.M., surgical wards. 2 P.M., operations, surgical and gynæcological wards, medical, surgical, and gynæcological clinics. 4.15 P.M., Mr. Green-Armytage: Trespass.
TUESDAY.—11 A.M., surgical wards. 2 P.M., operations, medical, surgical, and throat clinics. 4.15 P.M., Dr. Coden: Choice of Anæsthesia.
WEDNESDAY.—10 A.M., children's ward and clinic. 11 A.M., medical wards. 2 P.M., gynæcological operations, medical, surgical, and eye clinics. 4.15 P.M., Mr. Harvey Jackson: Neuro-surgical Investigations.
THURSDAY.—10 A.M., neurological and gynæcological clinics. Noon, fracture clinic. 2 P.M., operations, medical, surgical, genito-urinary, and eye clinics.
FRIDAY.—10 A.M., medical wards, skin clinic. Noon, lecture on treatment. 2 P.M., operations, medical, surgical, and throat clinics.
SATURDAY.—10 A.M., children's and surgical clinics. 11 A.M., medical wards.
The lectures at 4.15 P.M. are open to all medical practitioners without fee.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, Wimpole-street, W.
MONDAY to SATURDAY.—ST. PETER'S HOSPITAL, Henrietta-street, W.C., all-day course in urology.—NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W., all-day course in cardiology.—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in dermatology. (All open to non-members.)

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
TUESDAY.—5 P.M., Dr. W. Griffith: Eczema.
WEDNESDAY.—5 P.M., Dr. I. Muende: Histopathology of Some Common Skin Diseases. (Chesterfield lectures.)

ST. GEORGE'S HOSPITAL, S.W.
THURSDAY.—5 P.M., Dr. Anthony Feiling: Neurological Demonstration.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY.—2 P.M., Dr. B. E. Schlesinger: Infant Feeding on the Breast. 3 P.M., Mr. Charles Donald: Hydrocephalus and Spina Bifida.
Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.
FRIDAY.—4.30 P.M., Dr. C. Worster-Drought: Physical Medicine in Diseases of the Nervous System.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY.—4 P.M., Mr. W. A. Mill: Difficulty in Swallowing.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY.—4.15 P.M. (Ear, Nose, and Throat Hospital), Dr. Charles Macartney: Nasal Diseases.

Births, Marriages, and Deaths

BIRTHS

BEILBY.—On Jan. 4th, at St. Bartholomew's Hospital, the wife of Dr. F. J. Beilby—a son.
GERRARD.—On Jan. 6th, at Banstead, the wife of Dr. W. W. Gerrard—a son.
GORDON.—On Jan. 8th, at Sutherland-avenue, Maida Vale, the wife of Dr. R. M. Gordon, of Silver End, near Witham, Essex—a daughter.
MILL.—On Jan. 5th, at Welbeck-street, the wife of Mr. W. A. Mill, F.R.C.S.—a daughter.
SAVILLE.—On Jan. 6th, at Whitstable, the wife of Dr. J. E. Saville—a daughter.

MARRIAGES

WALTON—DOWNTON.—On Jan. 6th, at St. Botolph's Church, Morley, Wymondham, Capt. Henry Courtenay Mansel Walton, R.A.M.C., to Mary Geraldine, eldest daughter of the Rev. B. M. Downton, of Wymondham.

DEATHS

BERNAYS.—On Jan. 8th, at the Rectory, Finchley, Adolphus Vaughan Bernays, M.B. Camb., of Solihull, Warwickshire, son of the late Rev. L. J. Bernays, Rector of Stanmore.
BIDWELL.—On Jan. 10th, at Teignmouth, Lawrence Bidwell, M.R.C.S. Eng., Surg.-Comd., R.N. (retd.).
BLUCKE.—On Jan. 11th, at Denmark Hill, H. F. S. Blucke, M.R.C.S. Eng., late M.O.H., Borough of Shaftesbury.
HELM.—On Jan. 4th, at Carlisle, Robert Dundas Helm, M.D. Edin., J.P.
JEANS.—On Jan. 4th, at Southsea, Surg. Rear-Admiral T. T. Jeans, C.M.G., M.B. Lond.
THORNICRAFT.—On Jan. 7th, at Artillery Mansions, Thomas Charles Thornicraft, M.R.C.S. Eng. (late of Kobe, Japan), aged 92.
WILLIAMS.—On Jan. 8th, at Newport, Mon., Herbert Egerton Williams, M.R.C.S. Eng., in his 80th year.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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NOTES, COMMENTS, AND ABSTRACTS

DOCTOR AND PATIENT *

BY SIR MAURICE CASSIDY, K.C.V.O., C.B., M.D., F.R.C.P.

SENIOR PHYSICIAN, ST. THOMAS'S HOSPITAL

FROM time to time we doctors, like most other men, let off steam by having a good grumble. For instance, we grumble about the vagaries of our patients, just as our patients grumble about the incompetence of their doctors. We grumble when the weather is fine and our patients are so healthy that we see starvation staring us in the face; and when the weather is bad we grumble again because we are run off our feet—and because the weather is so inclement. It is, in fact, seldom difficult to find something to grumble about, and it must be confessed that most of us derive a certain savage satisfaction from our grumblings. But there is one thing about which we never grumble—namely, the fact that we happen to be doctors; and this is a very agreeable reflection. We constantly encounter patients who tell us that they are bored by their work, or even loathe it; and we are very sorry for such unfortunates, for we doctors are to a man happy in our work, and I venture to say that most of us, if given the chance to start life afresh, would unhesitatingly choose to be doctors again, though possibly some of us would, with the experience we have gained, plan our professional lives a little differently.

The explanation of the doctor's contentment with his vocation is of course a very simple one. The man who does not like doctoring finds it out at an early stage of his career as a student, or his examiners find it out for him, and he switches off into the timber trade or some other more congenial occupation—possibly he writes a best seller about dishonest doctors! We are happy in our work for various reasons. Paramount, of course, must be the extraordinary satisfaction of helping others; of saving lives from time to time, and constantly of relieving suffering, physical or mental. Then how fortunate we are to continue to be students throughout our professional lives! Never a week passes but we learn something new and stimulating about the science or art of medicine, and to some few of us it may be granted to add a stone, if it be only a pebble, to the constantly expanding edifice which our profession has been engaged in building since the time of Hippocrates.

Finally, we have the inestimable advantage of intimate contact with all sorts and conditions of men. I doubt if any other profession offers such priceless opportunities of making firm and valued friendships. In this respect, as in many others, the general practitioner is more fortunate than the consultant, who sees, or should see, most of his patients once only, and very few of them more than two or three times a year. When the consultant accompanies a middle-aged or elderly practitioner on his round, I can assure you that he is often filled with envy as he sees how his host is greeted with obvious affectionate regard by all his patients. Many of them he has helped to bring into the world; he has seen them through the troubles of childhood and adolescence, and in due course he has perhaps assisted at the birth of *their* children. He has shared their happiness, and sometimes their sorrow, and they come to him for advice which is not always purely medical. To be able to achieve this happy relationship requires something more than professional erudition, and it is sometimes a little difficult to understand how it is that one doctor succeeds and another fails to win the confidence and affection of his patients. I venture to suggest that "a good bedside manner" is not the solution of the problem, and I am glad to think that the breezy type of practitioner, with his "Well, Mrs. Smith, and how are we this morning?" is rapidly becoming extinct. It seems to me that after professional competence which, of course, must always come first, sympathy and a sense of humour are the most essential qualities in a doctor. And by sympathy I do not mean maudlin sentimentality, but rather the capacity to put yourself in the patient's place and attempt to realise his attitude towards his illness, remembering always that, bluff though he may, anxiety, and often fear, haunt him.

THE DOCTOR AS PATIENT

When I first put up my brass plate, an old general practitioner said to me, "You will never succeed in practice unless you find that the majority of your patients leave your consulting-room looking ten years younger than they did when they entered it!" This very satisfactory phenomenon is one which is, I am sure, familiar to most of you. Another bit of advice which he gave me is not always easy to follow. It was to have, oneself, at least one acute and one chronic illness; and if one could undergo an abdominal operation, so much the better. Finally, he added, one should pass a catheter and an œsophageal tube on one's own vile body. I must confess, however, that I never screwed myself up to follow this advice in full, though I learnt much from the acute and the chronic illness which in the course of time fell to my lot. In passing, it is curious that we doctors make such thoroughly bad patients when we fall ill ourselves, for it is notorious that we do so. It is, I suppose, very difficult for us to dissociate ourselves from the technical aspect of our malady. We score off the layman in so far as not to be anxious about the sebaceous cyst or lipoma which the layman fears to be a cancer. On the other hand, some small glandular enlargement which the layman would ignore conjures up to us visions of leukæmia or lymphadenoma, and when we over-smoke we suspect carcinoma of the larynx, and so on. On the whole I think the doctor has the worse time when he is ill, and we must remember this when we doctor doctors.

Doctors' relatives again form a problem apart, and seem to make a rule of contracting odd diseases which seldom run a straightforward course. Once more you will agree with me that no doctor should undertake the professional care of any near relative, except for trivial ailments. And when we entrust the care of our wife or child to a colleague we should leave the patient entirely in his charge. We have all of us suffered many things from anxious medical relatives who constantly butt in with suggestions which do not make our task any easier. There are even doctors who insist on being present when their wives are being operated on, to the extreme discomfiture, no doubt, of the surgeon.

* Purvis Oration delivered to the West Kent Medico-Chirurgical Society on Dec. 10th, 1937.

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THE DOCTOR IN A HURRY

To revert to my old doctor mentor, there were sundry other hints which he gave me, and some of them stuck in my memory. They are of such an elementary nature that I hesitate to retail them to this audience; but I venture to do so because not every doctor seems to have been similarly advised. For instance, he told me that there are few things which a patient dislikes more than a feeling that the doctor is in a hurry. "Never go into a patient's bedroom with your overcoat on," he said, "this will make the patient think you mean to be off in a minute or two. However over-worked and pressed for time you may be, don't let your patient sense it. Let him feel that, however short the consultation may have to be, during that period of time the nature of your patient's illness and how to get him well are the only things which matter to you." His last, and perhaps his best, bit of advice was "Never sit on the patient's bed." Those of us who have been seriously ill and have endured 12 stone of doctor on the edge of our bed will admit that he was right, often though most of us break this rule. But if you *must* sit on the patient's bed, for Heaven's sake don't idly turn over the pages of his *Daily Mirror* while he pours forth his tale of woe—an offence which I assure you I have seen committed more than once.

PROFESSIONAL CONTACTS

But if the general practitioner has the advantage over the consultant in respect of contact with his patients, the consultant is more fortunate in his opportunities of contact with other doctors, and this, you will all agree, is at the same time one of the most pleasant and one of the most important features of our professional lives. When we doctors meet we all of us learn something, and we rub one another's angles off. It is desirable that our meetings should not be too specialised and that general practitioners and consultants should meet on common ground. Also it is particularly desirable that specialists should commune not only with specialists, and finally that the young and the elderly should take counsel together. Certainly the elderly can learn much from the young, and even the most up-to-date young doctor can sometimes pick up a few wrinkles from an older colleague. As I have already said, all this is easy for the consultant, in fact it is almost forced upon him. He meets his colleagues of his own, and perhaps of other hospitals, almost daily. He learns from his house physician and his registrar. Various medical societies, medical dining clubs, or travelling clubs are available to him, and he would be foolish indeed not to embrace every opportunity so offered. But for the suburban, or still more for the country practitioner, such varied professional contacts are not available. Of necessity he must often lead a life of comparative professional isolation, though the modern tendency for the formation of firms of general practitioners with differing professional bents has done much to mitigate this. Fortunately the local medical society comes to his rescue, and on it he must rely for the catholic professional contact which should be such an invaluable factor in his career. Happy is the doctor, be he consultant or general practitioner, who has the chance of joining such a virile and enlightened association as the West Kent Medico-Chirurgical Society. When Dr. Prior Purvis founded this society in 1856 he raised up for himself a lasting monument, for so long as there are doctors in Kent this society will continue to flourish, and every year his name will be commemorated, however unworthily, in the Purvis Memorial Lecture.

MANAGEMENT OF THE NEUROPATH

Many years ago the St. Thomas's Hospital Medical and Physical Society, a club of medical students, invited me to open a debate on a topic of my own choice. The topic which I suggested was "That in the interests of public health the medical profession should be abolished." Briefly, my thesis was that if there were no doctors many patients would die as a result of peritonitis, or obstruction, or abscesses, who might have been saved by timely operation; fractures would not be set, nor ruptures cured; malaria and syphilis would not be adequately treated, and so on. But, I maintained, these items on the debit side would be heavily outweighted by those on the credit side. What a much happier and healthier world this would be, I urged, if the sphygmomanometer had never been invented, and if nobody knew what his blood pressure was! How humanity would gain if "dropped stomachs" and "colitis" had never been heard of!

I did not, of course, mean to be taken seriously in this piece of fooling. My object was to bring home to those young men what an infinity of harm the doctor may do when he attempts to explain neurotic symptoms on a non-existent organic basis. Every experienced general practitioner will admit that most of his time is spent in dealing with psychoneuroses. Thirty per cent. of the patients whom I see in consulting practice have, to the best of my belief, no organic lesion. Yet how many of us have the courage to tell our neuropathic patients what is really the matter with them? Very few, I fear. Recently I saw a woman of 38 who had been "delicate since childhood." The doctors had always been fighting her anæmia, she said. She had undergone deep X ray treatment for facial neuralgia, and when this failed, after a period of partial relief, ganglionectomy had been proposed, but fortunately declined. Naturally, her antra had been punctured and her septum straightened. Her spine had been manipulated by an orthopædic surgeon. Then suprarenal deficiency, long unrecognised, had at last been detected, and for a time suprarenal gland by the mouth had seemed to promise a cure. But alas the improvement was short-lived, and soon rapid heart action dominated the scene. Another doctor discovered that it was not defective suprarenal but rather over-active thyroid which was at fault, and iodine was administered. Finally an enterprising gynæcologist ascribed all her troubles to a retroverted uterus, performed ventral fixation and, en passant, removed her appendix. But she still suffers.

Now, this incredible story is almost a commonplace. Most of you can probably recall many analogous cases. This unfortunate young woman must have been seen by scores of doctors in various parts of this and other countries. Yet, she assures me, never a one had attempted to explain her many symptoms on the very obvious psychogenic basis.

On Sept. 23rd, 1518, Henry VIII wrote as follows in his Charter to the Royal College of Physicians: "Whereas, we consider it the duty of our Royal office by all means to consult the happiness of the people under our rule, we have thought it to be chiefly and before all things necessary to withstand in good time the attempts of the wicked, and to curb the audacity of those wicked men who shall profess medicine more for the sake of their avarice than from the assurance of any good conscience, whereby

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many inconveniences may ensue to the rude and credulous populace." In the year 1937 we must confess that there are still to be found wicked men "who profess medicine more for the sake of their avarice than from the assurance of any good conscience," but I am glad to believe that, in this country at any rate, such men are few and far between. Many of the doctors whom this unhappy lady consulted were no doubt quite honestly convinced that they had discovered an organic cause for her symptoms, and that their treatment of it was rational. But I fancy that the majority of them realised at once that her troubles were psychogenic, but did not dare to say so.

What is the explanation of this discreditable state of affairs? I believe it is that many of us are still obsessed by the idea that our patients will decline to accept a psychogenic explanation for their symptoms. We know that they are often ashamed of such an explanation and are apt to resent it. Whereas the abdominal neurote will positively brag about his "dropped stomach," and proudly exhibit some horribly uncomfortable and entirely superfluous abdominal support; and the cardiac neuropath will excite sympathy from his relatives and friends by discoursing on his "tired heart" and the relief obtained from that magical drug digitalis. But we all know only too well that the improvement following such specious treatment is but short-lived. Sooner or later our patient will relapse, though possibly with quite different symptoms. Time was when the doctor who plucked up his courage and told a neuropath that his undoubted ill health was not due to any organic disease invariably elicited the indignant response "Do you mean to tell me that it is only nerves!"—and lost his patient. But I believe it to be true that nowadays patients are far more ready to accept a psychogenic explanation of their symptoms than they were some years ago. Most educated people have learnt that emotional upsets and conflicts can play havoc with our digestive processes, or with our circulation, for example. They are beginning to realise, too, that there are very few of us who do not from time to time suffer from disagreeable symptoms attributable only to nervous stresses of one kind or another, and that they are not "frauds" (to use their favourite word) when the dread of cancer engenders an anxiety state. It is, however, still very difficult to disabuse them of the idea that a neurosis is something to be ashamed of—an error which unfortunately is shared by some doctors.

I suggest to you, then, that we should be a little more courageous, and—may I venture to say it?—a little more honest, when dealing with neuropathic patients. The explanation of the true state of affairs must of course be done tactfully. It is futile to tell them that there is nothing the matter with them, and that they must pull themselves together and ignore their symptoms; and, in any case, this is not true. For instance, never tell a cardiac neuropath that he has a "tired," or a "toxic" heart, or that he has "a murmur which does not matter much." He will go away and brood over such statements, and wonder how long it will be before dropsy, or sudden death, occurs. Tell him with all the conviction you can that there is nothing wrong with his heart, as a heart. My experience is that these patients are enormously relieved at this news. I sometimes tell them that they are suffering from exactly the same most uncomfortable sensations as I experience when I go to look for a burglar, or when I begin to address a meeting such as this, and that these sensations are just as much out of my control as are their sensations. I explain to them that in both cases the palpitations and precordial discomfort are the result of emotional disturbances, which differ only in kind and in degree.

THE BLOOD PRESSURE OBSESSION

And now for a word or two about that widespread disorder of modern times which one may call the blood pressure obsession. I suggest to you that it is a mistake to take blood pressures too frequently, and that the patient should never be given any figures. I understand that there is one distinguished physician who feels so strongly on this point that he flatly declines to take the blood pressure of any of his patients. But perhaps this is carrying things too far! May I remind you, too, that blood pressures are often very variable, from day to day or even from minute to minute, in the same patient, and that in different individuals the normal pressure varies within wide limits. It is a fallacy that the blood pressure at age 40 should be 140, at age 50 150, and so on. In point of fact the average blood pressure at age 20 is 122, at age 35–40 125, and at age 55–60 133. Moreover, let me stress the fact that these pressures are *averages*, and that the normal pressure varies between 100 and 160, systolic. Owing to a misconception of the true facts of the case I venture to assert that a large proportion of the population are at present firmly convinced that their blood pressures are too low, and suffer accordingly. I assure you that for some time past whenever I begin to apply the armlet to my patients they almost invariably remark, "I'm afraid you will find it too low, doctor!" The subsequent finding being 110 or even 120, and therefore perfectly normal.

THE PATIENT'S ATTITUDE TO THE DOCTOR

And now to pass from doctors to patients. I have often wished that someone would publish a small manual entitled "Advice to Patients about to Consult their Doctor"—though I doubt whether such a pamphlet would be widely read, or, if read, acted upon. But what a lot of valuable time would be saved if our patients could be taught that all we want to hear from them is an account of their symptoms, as concise as possible and chronological! Also we want to know something of their daily routine, what time they get up and go to bed, the mental and physical stresses to which they are subjected, and their habits as to food, drink, and tobacco. What we do *not* want to know are the very things which they are just bursting to tell us—e.g., what Dr. X of Freiberg or Prof. Z of Lausanne thought about them.

The patient who particularly infuriates me is the one who, when asked what his trouble is, produces a large bundle of, usually, very mediocre X ray films, and says, "There are Dr. Blank's X rays." Almost worse is the one who reverently deposits on my desk a gigantic dossier of pathological reports, and looks quite injured when told that these will be looked at presently, after he has described his symptoms. Then there still exist patients who expect us to diagnose their illness without a complete physical examination of their person. My old doctor mentor used to say, "Insist that every one of your male patients takes off his shirt, collar, and vest, and that every female patient takes off her corsets." (Ladies *did* wear corsets in those days!) I have often thought that it is less difficult for a camel to enter the eye of a needle than it is to persuade a lady to remove her abdominal belt; but persuade her we must, or sooner or later we will endure the mortification of

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finding that we have failed to discover the existence of an unsuspected fibroid or something of the sort.

Then I would like to have our patients taught how to choose their doctor, and having chosen him to be loyal to him, in their own interests. I admit at once how difficult this is for them. Whenever they fall ill and do not speedily recover, they are importuned incessantly by well-meaning but misguided friends "Do see *my* doctor; he is too *marvellous*," or, more frequently, "Go straight to Prof. Blank at Berlin. The German doctors are years in advance of ours." (This cult of foreign doctors is, of course, a survival of witchcraft; one sees exactly the same thing when, in the hospital, the Lambeth patient tells you, with bated breath, what treatment a "black doctor" advised.) But when loyalty to the doctor is stretched to the breaking-point and confidence has gone, it is far better for the patient, and kinder to the doctor, to come out into the open and say so, and choose another doctor. It is quite true that in sickness "where no counsel is the people fall," but one must alter the rest of the quotation—"In a multitude of counsellors there is *not* wisdom." My heart often bleeds for the poor rich man when I see him surrounded on his sick-bed by some half a dozen doctors, and reflect how very much more fortunate is he who is unable to afford such a very dubious luxury.

"AN INDEPENDENT OPINION"

This brings me to the question of "a second opinion." And here we will all be on common ground when I say that it is very natural that the patient or his relatives should ask for further advice in serious or obscure illness. It is bound to be a little galling to any doctor when a consultation is requested though all is going well and he feels quite competent to deal with the situation. But it is, or should be, a first principle with every doctor to forestall his patient in asking for a second opinion when things are not going well. The general practitioner who gets the reputation of constantly demanding a consultation naturally soon forfeits the confidence of his patients. But I think we should always ask for further advice when in doubt as to diagnosis and treatment. And in cases of dangerous illness, even if we feel that the diagnosis is only too clear and that all treatment is futile, it is usually wise to explain the situation to the relatives, to state our conviction that nothing more can be done, but at the same time to ask them if they would like further advice, so that afterwards they can feel that everything possible had been done.

Then comes the question of choice of consultant. And here we are usually up against a brick wall. It seems to be impossible to disabuse the patient and his relatives of the idea that the consultant will be "biased" by the general practitioner. I do wish that it were possible to bring home to our patients that no reputable consultant will be biased by any other doctor, and that the best judge as to who is the right consultant for any particular patient is that patient's family doctor! The patients who sneak off to consultants behind their doctor's back are not doing the best for themselves. They crave for "an independent opinion"; but only too often they are unfortunate in their choice of consultant, to put it mildly. And the consultant is hampered in his work owing to the fact that important information, which only the general practitioner could give him, is being withheld. Finally, when this perhaps unsatisfactory consultation is over, any treatment which the consultant can suggest can be carried out only under the supervision of the general practitioner, who is apt to be incensed when he hears what has happened. But, as I hinted before, this is one of the frailties of human nature which must be accepted and made the best of. We must all of us be prepared for this craving of the average patient for the so-called "independent" opinion. We must just try to visualise his point of view, and, if we can, to sympathise with it; but this is sometimes very difficult.

CARRYING HONESTY TO EXTREMES

Another understandable, but nevertheless regrettable, foible of our patients is their liking for elaborate investigation and spectacular treatment; but we must be very careful not to pander to this. I feel that there is a tendency for some transparently honest doctors to be carried away by their enthusiasm for what they conceive to be up-to-date scientific doctoring; they run through the whole gamut of laboratory investigation, hæmatological, bacteriological, biochemical, and radiological, where to the, shall we say, more prosaic, doctor there seems to be little indication for anything of the sort. The subsequent treatment is equally elaborate. It nearly always includes frequent colonic lavage, and various dietetic restrictions which seem to have no scientific basis. I need hardly add that vaccines or other injections—calcium is for some inscrutable reason the fashionable one at the moment—are almost a sine qua non. It cannot be denied that most patients, and even the very intelligent ones, are impressed by this sort of thing, and are apt to think that the doctor who does not indulge in these antics is not progressive. Wisdom usually comes to them ultimately through bitter experience; but at what a cost!

We must not go to the other extreme and become altogether nihilistic in the treatment of conditions for which we know of no specific therapy. It is a difficult thing, and perhaps an unkind deed, to tell the mother of a child dying of acute leukæmia that her child will most certainly be dead within a fortnight, and that no treatment will be of any avail. In such a tragic contingency I think it is justifiable to attempt some sort of treatment, even though you know it to be hopeless. I have never forgotten a young man with retrobulbar optic neuritis whom I sent to a well-known and very honest, perhaps you will say too honest, neurologist. He told the patient's mother that he did not know the cause of the optic neuritis; that the patient might go blind, or, alternatively, might recover; and that no treatment would be likely to help. This was, I think, carrying honesty to extremes. Needless to say the patient was taken to Zurich, where blisters were applied to the temples, and normal saline was injected in minim doses under the conjunctiva. Also, needless to say, to this day the mother is firmly convinced that only her prescience in taking her son to Zurich brought about the recovery of vision which so happily ensued! Still, though there is such a thing as being too honest, as in the instance just related, it is never to be forgotten that honesty is the best policy in doctoring as in everything else. It may sometimes be wise in the patient's interests not to disclose the full facts, but he should never be deceived.

"THE DOG SHOULD NEVER HAVE DIED"

Before I close I have a confession to make. It is this. When my dog is ill I behave like the most abject of patients. If one vet. does not quickly cure him I take him to another, and if necessary to a third, or even a fourth. I pour down his unwilling

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throat all the patent medicines and nostra which my doggy friends recommend. And finally, after he is dead I find myself telling everybody, "I'm sorry to say it, but the case was badly mismanaged by the vet. The dog should never have died."

SEROTHERAPY IN LEPROSY

THE serum that Prof. Reenstierna has prepared for the treatment of leprosy is obtained from sheep which have been previously inoculated with partially acid-fast organisms. The organisms used are the well-known Kedrowsky strain and a new strain, morphologically and culturally similar, recovered from a leprous patient's blood. Carbolic acid is added to a strength of 0·5 per cent., and after storing in a refrigerator for a fortnight the serum is tested for contamination.

The remedy has been tried on 65 cases of leprosy in Addis Ababa, on 53 in Columbia, and on 30 in Venezuela (*Acta med. scand.* 1937, Suppl. lxxxv). After its use nodules became flatter and softer and the skin covering them became wrinkled; the brownish colouring of the skin changed to normal; cutaneous ulcers of the face and extremities healed rapidly; nasal obstruction was relieved and ulcers healed; anæsthesia, neuralgia, paralysis of the hands, œdema, and fever all diminished. The patients each received three intragluteal injections of 10 c.cm. at two or three days' intervals, followed by another similar course after a month. Reenstierna gives details of the South American cases, with illustrations of improvement in 3, but no record is made of any diminution in the number of bacilli in the body. It is unfortunate also that a control was not arranged—e.g., by treating half the patients with serum of uninoculated sheep. This control would have been easy to carry out and an obvious cause of criticism might have been removed.

Reenstierna does not offer any suggestion as to how the serum acts. In closing he admits that it is still too early to give an opinion of the effects and that a cure through serotherapy alone is highly improbable. "But," he adds, "the rapid and favourable action of the antileprosy serum, observed by more than 20 physicians in different countries, on leprous manifestations on which injections of chaulmoogra oil and its derivatives have had little or no effect, entitles me to the assumption that treatment with antileprosy serum, carried out in the most advantageous manner, ought to be able to become a good auxiliary to the standard therapy with chaulmoogra."

A STUDY OF RACIAL DIFFERENCES

WHILE some believe that there are real and innate differences between the various races of mankind, others hold that these differences are superficial, depending not upon nature but upon nurture. When issues become political, as this one has, partisanship is apt to hinder the search for truth; and although both these creeds are stoutly, and often acrimoniously, defended, neither has been scientifically corroborated. Prof. S. D. Porteus sets out not to prove a preconceived theory but merely to collect data and draw what conclusions he may.[1] As he points out, the term "race" is only properly applicable to certain geographically and culturally isolated groups of people in which a common physical type has been established as a result of inbreeding and various factors of natural selection. If such groups are compared by means of mental tests and by a study of their environment, social adaptability, and educability, reliable evidence of relative superiority or inferiority may be obtained. For his present purpose Prof. Porteus chose the Bushmen of South Africa and two groups of Australian aborigines and found that, despite a less favourable environment, the Central Australian aborigines were in almost every respect superior to their more happily situated neighbours of the North West. No less interesting is his conclusion that the Bushmen of the Kalahari, though undoubtedly enjoying a better environment than the Central Australian aborigines, were less educable and inferior in planning ability, but superior in physical courage and artistic skill. This book is not merely a scientific treatise for the initiated; it is also a delightful book of travel.

[1] Primitive Intelligence and Environment. By S. D. Porteus, D.Sc. London: Macmillan and Co., 1937. Pp. 325. 15*s*.

PROTECTION AGAINST MEASLES

Dr. C. F. McKhann of Boston has been interested for some time in the use of placental extract in the prevention and modification of measles, and he has recently compared its effects with those of adult and convalescent serum.[1] The groups observed were fairly large, probably enough to be statistically significant. Complete protection was given with adult serum to 56·4 per cent., with convalescent serum to 75·4 per cent., and with placental extract 56·3 per cent., while the severity of the attack was modified in 23·8, 16·8, and 30·4 per cent. respectively. The placental extract appeared to be the most successful, with only 5·3 per cent. failures, followed by convalescent serum with 7·8 per cent. and adult serum with 19·8 per cent.

As McKhann points out, although there has been a steady decline in the death-rate from measles, this is believed to be due largely to general measures such as recognition that it is a dangerous disease, prevention of needless exposure, isolation of patients to combat secondary infections, and better child health and nutrition. Further improvement is desirable, but in employing such immunisation methods as these it must be understood that complete protection through the use of human immune bodies lasts only a few weeks. This is of particular advantage only when used in institutions or for acutely or chronically ill, debilitated, or very young children. Otherwise it is better to aim for the permanent protection given by an attenuated attack. This may be achieved by injecting the immunising agent either in full doses in the second half of the incubation period or in proportionately smaller amounts as soon as possible after exposure.

[1] *J. Amer. med. Ass.* 1937, **109**, 2034.

NEW PREPARATIONS

"NESTROVITE" BRAND VITAMIN CONCENTRATE.—Roche Products Ltd. (51, Bowes-road, London, N.13) have put on the market Nestrovite Emulsion and Nestrovite Tablets, accessory food preparations evolved in the laboratories of Roche and Nestlé and made in Great Britain. These contain vitamins A, B_1, C, and D in a palatable base, and for each vitamin the quantity present is stated precisely in international units. Two tablets (the usual dose for an adult) is regarded as "equivalent to approximately one tablespoonful of medicinal cod-liver oil, two tablespoonfuls of orange juice . . . and an ample allowance of vitamin B_1." The emulsion is recommended for infants, and the use of one or other of the two preparations is advised throughout childhood and in a variety of disorders in adults for which vitamin deficiencies have been held responsible.

"WELLCOME" BRAND CALCIUM MANDELATE COMPOUND.—The use of calcium (rather than sodium or ammonium) mandelate in the treatment of urinary infections was proposed by E. Schnohr in THE LANCET last year (1937, **1**, 1104). The preparation now put out by Burroughs Wellcome and Co. (Snow Hill-buildings, E.C.1) is a powder of which 4·4 grammes ("the normal adult dose") is equivalent to 3·0 g. of mandelic acid. The chief advantage claimed for the calcium salt is that it causes no nausea and only negligible digestive disturbance.

SULPHANILAMIDE TABLETS G.L.—Glaxo Laboratories (Greenford, Middlesex) are now manufacturing

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a preparation of *p*-aminobenzenesulphonamide (sulphanilamide), in tablets containing a quarter of a gramme and half a gramme.

We are asked to state that the London address of ORGANON LABORATORIES has been changed from 1, Gordon-square, W.C.1 to 77, Newman-street, W.1. The telephone number at the new Newman-street house will be Museum 2857 as previously.

THE BRITISH DRUG HOUSES LTD. have now completed their laboratories for the preparation of B.D.H. sera and vaccines and have produced an illustrated booklet containing notes on indications, administration, dosage, packings, and prices, together with a short bibliography of vaccine and serum therapy. This will be sent to readers applying to Graham-street, City-road, N.1.

Vacancies

For further information refer to the advertisement columns

Aberdeen University.—Lecturer in Bacteriology, £500–£600.
Army Dental Corps.—Dental Surgeons.
Auckland Hosp. Board.—Radiotherapist and Radiologist, each £1000.
Belgrave Hosp. for Children, Clapham-road, S.W.—Asst. Physician, 50 guineas.
Bethnal Green Metropolitan Borough.—Dental Anæsthetist, 3 guineas per session.
Birmingham, Children's Hosp.—Receiving Room Officer, £250. Res. Sen. Cas. H.S., £125. Also First Asst. to Orthopædic Dept., £100.
Birmingham City Education Committee.—Asst. School M.O., £500.
Blackburn, Brockhall Certified Institution for Mental Defectives, Langho.—Deputy Med. Supt., £750.
Blackburn County Borough.—Asst. M.O.H. and Asst. School M.O., £600.
Bootle General Hosp.—H.P., two H.S.'s, and Cas. O., each at rate of £150.
Cape Town University.—Sen. Asst. in Dept. of Anatomy, £800.
Cheshire, St. Anne's Home, Altrincham.—Res. Surg. O., £200.
Chesterfield, Walton Sanatorium.—Jun. Res. Asst. M.O., £350.
Dartford Rural District Council.—Part-time M.O., at rate of £250.
Ealing Borough.—Asst. M.O., £600. Res. Asst. M.O., £350. Also Ophth. Surgeon, £275.
Eastbourne, Princess Alice Hosp.—Res. H.S., £150.
East Suffolk County.—M.O.H. for Woodbridge Urban and Deben Rural Districts and Asst. County M.O.H., £776.
Evelina Hosp. for Sick Children, Southwark, S.E.—H.P., at rate of £120.
Gloucestershire Royal Infirmary.—Res. Surg. O., £200.
Grimsby and District Hosp.—Sen. and Jun. H.S.'s, at rate of £200 and £150 respectively.
Halifax Royal Infirmary.—Radiologist, £700.
Hampstead General and N.W. London Hosp., Haverstock Hill, N.W.—H.P. and H.S., each at rate of £100.
Horton General Hosp., Banbury.—Res. M.O., at rate of £150.
Hosp. for Sick Children, Great Ormond-street, W.C.—Asst. Pathologist, £400. Cas. M.O., at rate of £175. Also Two Anæsthetists, each 15 guineas.
Huddersfield, St. Luke's Hosp.—Res. M.O., £230.
Ipswich, East Suffolk and Ipswich Hosp.—Cas. O., £144.
Islington Metropolitan Borough.—Asst. M.O., £600.
Jewish Maternity Hosp., Underwood-street, E.—Res. Med. O., at rate of £50.
Keighley and District Victoria Hosp.—Second Res. M.O., at rate of £120.
King's College Hosp., Denmark Hill, S.E.—Asst. Physician.
Leeds City.—Asst. M.O., £500.
Leicester Royal Infirmary.—Res. Anæsthetist, at rate of £150.
Liverpool, Alder Hey Hosp.—Res. Asst. M.O. for Orthopædic Wards, at rate of £200.
Liverpool City.—Res. Asst. M.O.'s for Special Hospitals, each £200.
Liverpool County Mental Hosp., Rainhill.—Asst. M.O., 7 guineas per week.
Liverpool Dental Hosp., Pembroke-place.—Hon. Anæsthetist.
London Chest Hosp., Victoria Park, E.—H.P., at rate of £100.
London County Council.—Asst. M.O.'s, Grade 1, each £350. Also Temp. Part-time Asst. M.O.'s for School Medical Work, each 30*s*.
London Hosp., E.—Surgical First Asst. and Reg., £300.
Maidstone, Kent County Ophthalmic and Aural Hosp.—Ophth. H.S., at rate of £200.
Maidstone, Kent County Mental Hosp.—Asst. M.O., £509.
Maidstone, West Kent General Hosp.—H.P., £175.
Manchester, Ancoats Hosp.—Pathologist and Radiological Officer, each £400. Also Cas. O., £250.
Manchester, Christie Hosp. and Holt Radium Institute, Withington.—Res. Surg. O., at rate of £150.
Manchester Northern Hosp., Cheetham Hill-road.—Res. H.P. and Res. H.S., each at rate of £100.
Metropolitan Hosp., London, E.—Hon. Anæsthetist, £25.
Middlesex Hosp., W.—Hon. Physician for Dept. of Psychological Medicine.
Ministry of Pensions, London, S.W.—Medical Officers, £750.
National Hosp., Queen-square, W.C.—H.S., £100.
National Temperance Hosp., Hampstead-road, N.W.—Hon. Anæsthetist. Also Med. Reg., 40 gns.
Newcastle-upon-Tyne, Royal Victoria Infirmary.—Hon. Surgeon.
Persian Gulf, Bahrain Government.—M.O., 1400 Rs. per month.
Poplar Hosp. for Accidents, East India Dock-road, E.—Second Res. O., at rate of £175.
Portsmouth Royal Hosp.—H.P., H.S. to Orthopædic Dept., and Cas. O., each at rate of £130.
Preston and County of Lancaster Royal Infirmary.—Res. Anæsthetist, at rate of £200.
Preston and County of Lancaster Royal Infirmary.—M.O. to V.D. Dept., £350.
Preston, County Mental Hosp., Whittingham.—Res. Jun. Asst. M.O., £500.
Queen's Hosp. for Children, Hackney-road, E.—H.S. and Cas. O., each at rate of £100.
Rotherham, Alma-road Hosp.—Obstet. M.O. and Deputy Med. Supt., £750.
Royal Masonic Hosp., Ravenscourt Park, W.—Res. Surg. O., at rate of £250.
Royal National Orthopædic Hosp., 234, Great Portland-street, W.—Two H.S.'s for Country Branch, each at rate of £150.
Royal Naval Medical Service.—M.O.'s.
Ruthin Castle, North Wales.—Res. Physician, at rate of £200.
St. Leonards-on-Sea, Buchanan Hosp.—Hon. Surgeon.
Sheffield, Jessop Hosp.—Res. Anæsthetist, at rate of £100.
Sheffield Royal Infirmary and Royal Hosp.—Two First Assts. to Fracture Clinics, each £300.
South Eastern Hosp. for Children, Sydenham, S.E.—Hon. Pathologist, £50.
South Shields, Ingham Infirmary.—Jun. H.S., £150.
Surrey County Council.—A.M.O., £600.
Taunton and Somerset Hosp.—H.S., £125.
Torquay, Torbay Hosp.—H.P., £175.
Venlnor, Royal National Hosp. for Consumption, &c.—Second Asst. Res. M.O., at rate of £200.
Wakefield, Scotton Banks Sanatorium.—Sen. Asst. M.O. and Deputy Med. Supt., £450.
Walsall Manor Hosp.—Ear, Nose, and Throat Surgeon, £200.
Wolverhampton Royal Hosp.—H.S., at rate of £100.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Morley (Yorks, W.R.), Thirsk (Yorks, W.R.), Acton and Ealing (Middlesex), Barking (Essex), Carnforth (Lancashire), Kibworth (Leicestershire) and Ystalyfera (Glamorgan).

Appointments

BANHAM, A. R., M.B. Camb., F.R.C.S. Eng., Hon. Surgeon to the General Hospital, Northampton.
BINNING, REX, M.R.C.S. Eng., Clinical Assistant Anæsthetist to the Royal Sussex County Hospital, Brighton.
BIRDSALL, S. E., B.Chir. Camb., F.R.C.S. Eng., Hon. Laryngologist to the Woolwich and District War Memorial Hospital.
BRUCE-JONES, D. B. S., M.D. Durh., Hon. Physician to the Skin Department, Paddington Green Children's Hospital.
COLLEDGE, LIONEL, M.B. Camb., F.R.C.S. Eng., Hon. Assistant Surgeon to the Ear, Nose, and Throat Department of the Prince of Wales's General Hospital, London.
CREER, W. SAYLE, M.Ch.Orthop. Liverp., F.R.C.S. Eng., Orthopædic Surgeon-in-Charge of Fractures to the District Infirmary, Ashton-under-Lyne.
GARLAND, T. O., M.B. Camb., D.P.H., Medical Officer of Health for Kettering.
GOLDSMITH, A. J. B., M.B. Lond., F.R.C.S. Eng., Hon. Ophthalmic Surgeon to the Paddington Green Children's Hospital.
HUTCHESON, A. S., M.B. Glasg., Assistant Medical Officer of Health for Argyll.
JAMIESON, JANET M., M.B. Glasg., D.P.H., Maternity and Child Welfare Officer and Chief Supervisor of Midwives for Northumberland.
JENKINS, MARGARET W., M.B. Edin., Medical Officer at Winford Orthopædic Hospital, Bristol.
LAURENT, L. J., M.D., M.R.C.P. Lond., Deputy Medical Superintendent (Grade II) at the Eastern Hospital L.C.C.
MASON, G. A., M.B. Durh., F.R.C.S. Eng., Hon. Assistant Surgeon to the Royal Victoria Infirmary, Newcastle-upon-Tyne.
MILLS, EDWARD, M.B. St. And., D.P.H., Assistant Medical Officer of Health for the County of Inverness.
MONRO, A. B., M.B. Edin., D.P.M., Second Assistant Medical Officer at the County Mental Hospital, Rainhill.
MUMFORD, P. B., M.D. Manch., F.R.C.P. Lond., Hon. Consulting Dermatologist to the Christie Hospital and Holt Radium Institute, Manchester.
PORTER, ARTHUR, M.D. Camb., M.R.C.P. Lond., Out-patient Medical Registrar at St. John's Hospital for Diseases of the Skin, London.
SAVATARD, LOUIS, L.S.A., Hon. Consulting Dermatologist to the Christie Hospital and Holt Radium Institute, Manchester.
SOLLEY, RUPERT, M.B. Camb., Assistant Medical Superintendent at Exeter City Mental Hospital.
STEVENSON, D. C. L., F.R.C.S. Edin., Resident Surgical Officer at the Woolwich and District War Memorial Hospital.
TREBLE, H. A., B.M. Oxon., M.R.C.P. Lond., Assistant Physician to the Kent and Canterbury Hospital.
Middlesex Hospital.—The following appointments are announced:—
WILSON, C. P., F.R.C.S. Eng., Aural Surgeon;
MONKHOUSE, J. P., M.B. Lond., F.R.C.S. Eng., Assistant Aural Surgeon;
RIVETT, L. C., M.A. Camb., F.R.C.S. Eng., F.C.O.G., Obstetric Surgeon; and
WINTERTON, W. R., M.B. Camb., F.R.C.S. Eng., M.C.O.G., Assistant Obstetric Surgeon.

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ADDRESSES AND ORIGINAL ARTICLES

THE RÔLE OF ACTIVE OR PASSIVE IMMUNISATION IN THE CONTROL OF ENTERIC INFECTION

By W. W. C. Topley, M.D. Camb., F.R.C.P. Lond., F.R.S.

PROFESSOR OF BACTERIOLOGY AND IMMUNOLOGY IN THE UNIVERSITY OF LONDON, AT THE LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

A general principle that has emerged from the studies of a long succession of descriptive epidemiologists, from the data collected and analysed by medical statisticians, and from the more detailed and precise observations that have been rendered possible by the development of bacteriological technique, is that the prevalence of any infective disease depends on the integrated effects of many different factors. Some of these exert their influence on the hosts at risk, others on the infecting parasites, and others on the complex environment in which hosts and parasites react. It follows that the effective control of herd infection is never a simple problem. It depends on a knowledge of the nature of the parasite concerned, of its methods of attack, of its normal habitat, of its mode of spread, of the possible intervention of insect vectors of infection, of changes in host resistance, naturally or artificially acquired, and of many other factors. Intelligent administrative action demands an assessment of the relative importance of each link in the chain of epidemic causation, and a decision, arrived at in the light of all available data, as to the place, or places, in which that chain may most readily and effectively be broken. It must be noted, also, that the methods best suited to control any given infection will differ in different places and at different times. Thus, in the intestinal group of infections, the main factors concerned in effective control are an adequate system of sewage disposal, a water-supply carefully guarded from excretal pollution, a safe milk-supply, the purification of shell-fish, the control of such insect vectors as the house-fly, the detection of any human carriers who are concerned in the handling of water, milk, or foods, and the shielding of food from contamination by infected rodents. An ancillary measure, in certain intestinal infections at least, is afforded by active immunisation with a bacterial vaccine. In the absence of those sanitary services that afford freedom from the risk of infection, this may become a factor of primary importance. Similarly, if such services suffer from a temporary breakdown, prophylactic inoculation must be considered as a possible emergency measure. It must not, however, be forgotten that careful attention to personal and household hygiene will go some way towards compensating for defective public services.

It happens that recent events have raised afresh the problem of the control of enteric infection in this country, and particularly the rôle that should be assigned to prophylactic vaccination. In discussions in the medical press reference has been made to particular records of events, or expressions of opinion, and, in a general way, to the very extensive literature that has accumulated during the last thirty years or more. Since it would appear that different authorities draw very different conclusions from the same body of evidence, it may not be amiss to summarise that evidence afresh, at the risk of retelling a story that is well known to many. No useful purpose would be served by including in this brief survey an account of recent studies on the antigenic structure of the bacilli of the typhoid-paratyphoid group, since the available evidence in regard to actual events in the field is of an earlier date. We need only note that it is possible that the results that have been obtained in the past may be improved, or rendered more uniform, in the future by the use of more effective, or better controlled, reagents.

PROPHYLACTIC EFFECT OF ACTIVE IMMUNISATION WITH A TYPHOID, OR T.A.B., VACCINE

It will be convenient to begin with a summary of the evidence in regard to the effectiveness of antityphoid vaccination carried out under optimal conditions. Such conditions are provided when the persons inoculated are living in an uninfected area, and will not be exposed to any risk of infection until a week or more has elapsed after the last dose of vaccine has been given. The usual number of doses is two or three, given at 7- or 10-day intervals; so that a person may be regarded as having attained a maximal degree of protection some 14–30 days after immunisation is commenced. The generally accepted view is that this degree of protection is maintained for some months at least, and that a much longer period may elapse before it disappears entirely.

The best figures available are those which were collected by the Antityphoid Committee, and have been submitted to statistical analysis by Greenwood and Yule (1915). They refer to troops proceeding overseas for service in areas where enteric infection is endemic. Of 8664 uninoculated men, 272 contracted the disease during the period of observation, an incidence of 31·39 per 1000. Of 10,322 inoculated men, 56 contracted the disease, an incidence of 5·43 per 1000. The risk of contracting the disease under these particular conditions was, therefore, reduced to about one-sixth as the result of vaccination.

The figures for the epidemiological happenings of the Great War do not allow of any accurate comparison between inoculated and uninoculated men, in part because inoculation became universal in most armies at an early stage, in part because the exigencies of war made the collection of satisfactory statistics almost impossible. The events of 1915 in our own armies in France confirmed the view that vaccination greatly reduced the frequency of enteric fever; and nothing happened during the succeeding years of the war to throw serious doubt on this general conclusion. It should be noted, however, that the disease was by no means eliminated. Thus, among inoculated British troops in France during the four years of war there were 3963 cases of enteric infection (Harvey 1929), while among inoculated men of the American Expeditionary Forces during eleven months' service in France there were 1242 cases (Vaughan 1920).

There are, moreover, certain recorded instances which indicate that, under particular conditions of exposure, antityphoid inoculation may be singularly ineffective. One of the best documented is the account given by Hawn, Hopkins, and Meader (1919) of an outbreak of typhoid fever among a small American contingent. In all there were 98 cases among a company of 248 men, all of whom had been inoculated 6–12 months previously. This would be a strikingly high incidence, even among an uninoculated group.

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The history of the outbreak suggested that the men had been exposed to some common source of infection over a short period of time, and it seemed possible that an important factor had been communal bathing in a lake; but the exact mode of spread was not clearly established. Such happenings suggest that antityphoid inoculation, though it reduces the risk from intermittent contact infection, may be much less effective when those inoculated are submitted to severe or continuous risk.

One important point, at least, is entirely clear. Any argument based on the assumption that an endemic or epidemic prevalence of enteric fever can be brought to a speedy and final end by antityphoid vaccination alone can be disregarded. We are concerned with one item, sometimes an exceedingly important item, in a balance of effects, not with a single factor that tips the scales so decisively that all other factors may be ignored.

EFFECT OF ANTITYPHOID VACCINATION IN MODIFYING THE DISEASE

Before discussing the effectiveness of antityphoid vaccination under other, and less favourable, conditions, we may consider its influence on mortality, as contrasted with morbidity. Many authorities believe that, if an inoculated person contracts enteric fever, the disease is less likely to be severe, or fatal, than if it had occurred in an uninoculated person. There are, in the available records, numerous examples of comparative case-fatality rates in the inoculated and uninoculated that support this view; but they are based in considerable part on diagnoses established by agglutination tests. All would agree that this method is less reliable than diagnosis by the isolation of the causative organism from the blood, fæces, or urine; and, if reliance is placed on agglutination tests alone, it is probable that a certain number of atypical febrile attacks will be incorrectly diagnosed as enteric infections. Certain observers, and particularly Vaughan (1920) and Ledingham (1921, 1925), have thrown doubt on the existence, or frequency, of this modified typhoid in inoculated persons. Their careful and valuable studies have shown that, if the diagnosis of enteric infection is limited to those cases in which the causative organism has been isolated, usually from the blood, the severity of the disease in the inoculated, as evidenced by the clinical picture, or by the case-fatality rate, differs in no way from that observed in uninoculated persons. Conversely, among inoculated persons suffering from the characteristic clinical disease, the isolation of the causative organism is accomplished as readily and frequently as in uninoculated patients.

The difficulty of interpreting these facts is obvious. If active immunisation with a T.A.B. vaccine, in addition to reducing the frequency of the disease, lessens its severity in those that are attacked, it will most probably do so by decreasing the intensity and duration of the bacteræmia, and the severity and extent of the intestinal lesions. This will almost certainly result in a clinically atypical illness, and in a lessened frequency of positive blood and stool cultures in patients submitted to ordinary routine examinations. What we lack is an adequate record of repeated blood and stool cultures, carried out by the more effective methods now available, and correlated with the results of agglutination tests, which would allow us to form a better opinion as to the relative frequency of mild atypical infections in the inoculated and uninoculated.

Meanwhile, it should be noted that the views advanced by Vaughan and by Ledingham, even if fully substantiated by future studies, would not justify us in disregarding entirely the low case-fatality rates recorded by several observers in inoculated persons. Where both morbidity and case-fatality rates are given for an inoculated and uninoculated group, the two rates are interdependent. If we exclude those cases in which the causative organism has not been isolated the case-fatality rate will be increased, but the total morbidity-rate will be reduced. In dealing with the gross recorded rates for comparative purposes, the morbidity-rates should clearly be weighted by the case-fatality rates.

EFFECT OF ANTITYPHOID INOCULATION DURING AN ENDEMIC OR EPIDEMIC PREVALENCE

It is clear that the prophylactic vaccination of persons exposed to risk during the period of immunisation is likely to be less effective than when the risk can be postponed until maximal immunity has been established.

The possible disadvantages involved in this procedure may be considered under three heads:

(1) The resistance developed during the immunisation period itself, which may be regarded as lasting about 14–30 days, according to the number of injections given and the intervals between them, may be so slight as to be relatively ineffective.

(2) It is possible that the well-known "negative phase," associated with a decrease in the antibodies in the blood, may induce a transient lowering of resistance after each injection of vaccine.

(3) In the inoculation of any large number of persons already exposed to risk, it is probable that some of those inoculated will be already infected, and such an event may react unfavourably on the course of the infection.

The first and second of these possibilities may conveniently be considered together. There is ample evidence from animal experiments that resistance to the injection of living bacteria, or their toxins, and not merely the antibody content of the serum, increases with repeated injections given at properly spaced intervals, at least during the first few injections of a series; so that we shall expect the level of resistance attained during immunisation to be lower than after its completion. It is far less certain that the "negative phase" is associated with any significant lowering of resistance; and in any case such lowering would probably be very transient. Since there is a very general agreement that the possible effects of this negative phase may be neglected in the inoculation of uninfected persons, it seems unnecessary to discuss this point in any further detail.

When we inquire how far our expectations, based on these animal experiments, are borne out in practice, we are met with the difficulty that the recorded data are, in most cases, not of a kind to permit of any comparison between inoculated and uninoculated persons. On one point there is no doubt at all. The inoculation of existing contacts of typhoid cases, or of persons after their entry into an infected area, or of persons during an epidemic, does not prevent the occurrence of fresh cases. There seems little point in citing particular instances at random from an extensive literature; but, since demands have recently been made for actual records of happenings in man, mention may be made of the occurrence of 72 cases of typhoid among men inoculated on, or soon after, arrival in an American training camp (Lull 1935), of 24 cases among persons

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inoculated during a water-borne epidemic of typhoid (Dean 1931), and of large numbers of cases among persons inoculated during the later stages of the great Hanover epidemic (Stroebe 1928).

Such records tell us nothing of the relative morbidity-rates in the inoculated and uninoculated; but Ramsey (1935) has published data on which such a comparison can be made. Ramsey's paper has in fact been quoted during the recent discussion of this problem; but, as Greenwood (1937) has pointed out, the quotation was highly misleading. The figures relate to the incidence of typhoid fever among inoculated and uninoculated contacts of primary cases occurring in different areas in New York State, the inoculations being carried out at varying periods after the primary case was notified. It should be noted that all cases arising during an epidemic were excluded, and that the period of observation covered 90 days from the appearance of the primary case. The cases among the inoculated were divided into those occurring between the first and second injection of vaccine, between the second and third, and after the full course of three doses had been completed. These were compared, according to their time of occurrence in relation to the primary case, with the number of cases that would have been expected during the same time interval, calculated from the actual contact infections among the uninoculated persons in the same households. In each case the inoculated showed an advantage in the total infection rates; but the difference between the inoculated and uninoculated groups in the case of those infected between the first and second, or second and third, doses of vaccine were not statistically significant; nor were they consistent when the total number of households observed were divided into two large groups according to the removal, or non-removal, of the primary case. Ramsey concludes that it is not well established that any substantial protection is afforded during the interval between the beginning and completion of vaccination.

If attention is confined to those persons who completed the course of vaccination without contracting typhoid fever, the result is different. The inoculated show a significant and consistent advantage as compared with the uninoculated. Over the period concerned the morbidity-rate was about four times less in the thrice-vaccinated contacts, an advantage somewhat less than the 6 : 1 ratio recorded by Greenwood and Yule for prophylactic vaccination under optimal conditions.

It should be noted, in this connexion, that the majority of contact infections occur during the first few weeks following the notification of the primary case—that is, during the time when prophylactic vaccination will be in progress—and that the effect on the total number of contact infections will be lessened for this reason.

PROVOCATION TYPHOID

Turning now to the question of the inoculation of those persons who are already infected, though they have not yet shown the clinical symptoms of the disease, we are on entirely different ground. There is ample evidence that fatal infections may follow the injection into experimental animals of dead bacteria, or their products, together with doses of living bacteria that would not be lethal alone. The "aggressin" theory of Bail and his colleagues, elaborated in a long series of papers published during the first ten years of this century, is based on repeated observations of this kind; and the relevant observations themselves have been fully confirmed by many other workers, though Bail's interpretation of them has been subjected to considerable criticism. It may be noted that there are good reasons for believing that the aggressive action of dead bacteria, or their products, cannot be attributed, at least wholly, to the induction of a negative phase, in the usual meaning of that term. It is, indeed, very doubtful whether this aggressive effect is strictly specific in the immunological sense, though it probably includes specific factors.

We are, at least, justified in concluding that the results of animal experiments raise a doubt as to the wisdom of injecting into persons already infected with organisms of the enteric group the customary large prophylactic doses of T.A.B. vaccine.

There seems, however, to be a reluctance among some of those who have recently discussed this problem to draw any inferences from experiments on animals, and insistent demands have been made for records of similar events in man. Some of these demands almost suggest a doubt as to whether such records exist. The doubt is easily removed. There is an extensive literature dealing with the occurrence of "provocation typhoid"—the onset of the disease so soon after antityphoid vaccination as to suggest a relation of cause and effect. Reference may be made to papers by Friedberger (1927) and Stroebe (1928). Those who desire further references will find many in each paper.

The literature of this problem consists, for the most part, in the description of events that suggest, sometimes very strongly, the activation or exacerbation of an already existing infection. Several authors, for instance, quote an account of an outbreak of severe typhoid fever in a certain regimental company, the cases developing 8–14 days after the men had been inoculated, and the case-mortality reaching the unusual figure of 44 per cent. Other similar, but less striking, happenings are on record; though some authors state that they have never observed any such provocative effects.

Some approach to a quantitative assessment of the effect of antityphoid vaccination in those already infected may be attempted by a comparison of the severity of the disease in those falling sick at various intervals after the vaccine has been administered. Stroebe (1928), whose paper is judicial, and who holds no adverse view in regard to the use of antityphoid vaccination under other conditions, has provided data of this kind. In 30 cases of typhoid fever coming under his own observation soon after the patients in question had received a dose of vaccine, he notes that, when the symptoms appeared within two days after the first or second injection, the onset tended to be unusually sudden, with violent and persistent rigors, and the subsequent course of the disease was in most cases severe. Cases in which the initial symptoms developed after longer intervals tended to be milder. This sudden onset, with severe rigors, has been referred to by others who have described cases of provocation typhoid. It was, for instance, noted in the outbreak in the regimental company referred to above. Vaughan (1920), who compares the course of typhoid fever in inoculated men of the American Expeditionary Force in relation to the time elapsing between inoculation and the development of symptoms, notes the frequency of sudden onset in cases occurring within a month of inoculation.

Case-fatality rates in relation to the time elapsing between inoculation and onset are not available in sufficient number, or in sufficiently large groups, to justify any conclusion. There is the recorded

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mortality of 44 per cent. in the outbreak of provocation typhoid already referred to, which is far above any normal figure. In Vaughan's records cases occurring within one month after inoculation showed a fatality-rate of 15·2 per cent. This was higher than the average rate for all cases, or than the rates in those later months in which the total number of recorded cases was 20 or over; but the run of fatality-rates was irregular, and little weight can be attached to these figures. In Lull's record of typhoid fever among inoculated men in an American training camp, 2 deaths occurred among 5 persons who contracted typhoid fever within a month of vaccination, as compared with 4 deaths among 67 persons in whom the interval between inoculation and onset was longer; but, here again, no significance can be attached to such small numbers.

The impression left by these and other records is that the occurrence of provocation typhoid, often associated with a sudden onset and a severe course, is a well-attested fact; though the available data do not justify any conclusion as to the frequency of such an event. The doubts raised by animal experiments as to the desirability of inoculating persons already infected are therefore accentuated by experience in man. They must, however, be left as doubts, not as established adverse conclusions. It is at present impossible to obtain any measure of the summed effects of vaccination in infected persons who have not yet developed symptoms of disease, or to tell how far the harm that seems certainly to be done to some of them may be counterbalanced by good that may be done to others. If we take into consideration both the possible induction of provocation typhoid, and the relatively low level of resistance that appears to be attained during the period of immunisation, there seems much force in Stroebe's conclusion that vaccination during the incubation period, or in the presence of latent infection, is a procedure that, on the existing balance of evidence, is better avoided.

VALUE OF ANTITYPHOID VACCINATION UNDER DIFFERENT EPIDEMIOLOGICAL CONDITIONS

When we turn to the practical administrative problem of the control of enteric infection, the picture we have obtained of the effect of antityphoid vaccination under different conditions must, in each case, be fitted into the framework provided by the particular environment with which we are faced. With most of the cases that commonly present themselves we can deal very briefly, for they have been considered inferentially above.

Clearly vaccination with T.A.B. vaccine will be a preventive measure of major importance when persons living in an uninfected area with well-developed sanitary services migrate to another area in which the sanitary services are inadequate and enteric infection is endemic. Even here, however, it should never be allowed to induce a false sense of security, or to lessen the emphasis on other methods of control. Strict attention to military, household, and personal hygiene will go far to reduce the risks run by those stationed in endemic areas, and all possible precautions should be taken along these lines.

A different set of conditions are presented when we are faced with an endemic, or endemic-epidemic, prevalence of enteric infection among a population already living in an area in which the sanitary services are deficient, and cannot be readily or rapidly improved. There are two particular administrative problems that may usefully be considered under this head. There is the case of a labour population, working on mines or plantations. Such persons are already at risk; but, assuming the prevalence to be of the usual smouldering type, there will not, at any one time, be large numbers already infected. Moreover, a prevalence of this type commonly shows seasonal fluctuations, so that it will often be possible to select a quiescent period for vaccination. Under such conditions the risk of provocation typhoid will not be great, though it will not be absent. The balance of probabilities would seem to weigh heavily in favour of the inoculation of all those at risk, and, of course, of all new entrants to the mine or the plantation. This conclusion has been confirmed by the experience on South African mines, and elsewhere. Here, again, there should be no relaxation of effort to make all possible improvements in general sanitary control.

The second case is that of a widespread rural population, disposing of their excreta as best they may, and drawing their water-supply from wells and streams. Under such conditions it is not unusual for scattered foci of enteric infection to develop, sometimes as single cases, sometimes as small outbreaks. The prophylactic vaccination of all inhabitants in such a widespread area, with revaccination at intervals of a year or more, would be administratively very difficult, if not impossible; and, as Ramsey (1934) has emphasised, the probable gain would be in no way commensurate with the effort required, or with the inconvenience caused. If, however, we confine our attention to those who are in close contact with a case, or cases, of the disease, the argument in favour of prophylactic vaccination is stronger, because the risk to which such persons are exposed is greater. It is true that the possibility of inducing provocation typhoid must be considered, and that, as Ramsey (1935) has shown, the protection afforded will be least when the risk of infection is greatest; but his figures clearly suggest that, if we exclude epidemics in which many persons are infected within a short interval of time, the vaccination of contacts will on balance do more good than harm. We shall not, however, "abort" a localised epidemic, or reduce contact cases to negligible proportions. Here, again, great stress should be laid on careful instruction in household and personal hygiene. A possible alternative method of immunisation is discussed below.

THE RÔLE OF ANTITYPHOID VACCINATION DURING A WATER-BORNE, OR MILK-BORNE, EPIDEMIC IN AN URBANISED COMMUNITY

When we turn to the conditions with which we are particularly concerned—the occurrence of a water- or milk-borne epidemic of enteric fever in an urbanised, or partially urbanised, area with an organised system of sewage disposal, and a public water-supply—we are faced with a very different problem. A water-borne epidemic is due to an accidental and transient breakdown in a service that is normally highly efficient. The situation, when such an accident happens, is differentiated sharply from those we have considered above. A proportion of the population living within the administrative area have been simultaneously subjected to a serious risk of infection, the actual number involved depending on the extent of the area supplied with water from the polluted source. As soon as the source of pollution is traced, which will usually be within a week or so of the notification of the first case, and may be much sooner, the water-supply to the affected

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area will be rendered safe by chlorination, or by other appropriate means.

We are then faced with the following situation. A certain number of persons, say a few hundred to a few thousand, living within a known and limited area, have been exposed for a limited period, known to have ended on a particular day, to the risk of drinking water polluted with typhoid or paratyphoid bacilli. The remainder of the population living within the administrative district, who may perhaps number many thousands, have not been exposed to this risk. The detection and purification of the polluted water-supply has restored the whole district to a condition of satisfactory sanitary control, so that there is no likelihood of a prolonged endemic-epidemic prevalence, such as commonly follows a large epidemic in an area with inadequate sanitary services. The conditions existing on the detection of a milk-borne epidemic of enteric infection, though differing in certain ways, are sufficiently analogous to demand no separate discussion.

In such circumstances as these, should active immunisation with an antityphoid, or T.A.B., vaccine be employed, and, if so, who among the population at risk should be vaccinated?

Among those living in the area supplied with the polluted water a considerable, but unknown, number are already infected. Some of these are incubating the disease; and we shall expect a crop of new cases, continuing for a month or rather longer, consequent on this original mass-infection. Other persons, who have in fact been infected, will never develop the disease in its characteristic form, though some of them will become carriers. Others again, for one reason or another, will have escaped the initial risk; but some of these will later become contacts of primary cases. Apart from the cases, we cannot tell, during the early and critical stages of the epidemic, to which category any particular person living within the affected area belongs. If we inoculate every person within the area who has not yet developed the disease in an obvious form we shall quite certainly be including many who are in the incubation stage, or who have developed a latent infection. We shall be in the same position if, during the first few weeks of the epidemic, we inoculate only those who are contacts of diagnosed cases. We shall be running a maximal risk of provocation typhoid, and gaining a minimal return in the form of increased resistance during the critical period. It has already been noted that it is impossible, on the evidence at present available, to determine whether, on balance, we are likely to do more harm or good; but, with the position as doubtful as it is, it would seem inadvisable to employ active immunisation with the usual prophylactic doses of vaccine under these particular conditions.

If we turn to those living outside the area primarily affected, the position is entirely different. They have not been exposed to the initial risk, and they may safely be regarded as uninfected. The reasons that render vaccination undesirable, or at best of doubtful value, within the primarily affected area do not apply. The subsequent risk to which these persons will be subjected is very slight, though it is certainly a little greater than in a district in which no recent epidemic has occurred. It seems doubtful whether any attempt to vaccinate all those living in the administrative district, but outside the area primarily affected, would be either practicable or wise. The question seems one for personal decision rather than for administrative action. If any individual, after the smallness of the risk has been explained to him, wishes to reduce that risk still further at the cost of the slight inconvenience caused by antityphoid vaccination, he should, I think, be vaccinated; but I should not expect the aggregate effect of such vaccination to result in any significant reduction in the total number of cases.

AFTERMATH OF A WATER- OR MILK-BORNE EPIDEMIC

One result of any large-scale epidemic due to infected water or milk will be the persistence in the affected area of numerous carriers of typhoid or paratyphoid bacilli, some of whom will have passed through an attack of the disease, while others will not. This persistence of latent foci of infection will not seriously affect the ordinary inhabitants of the district, who will be protected by efficient sanitary services, reinforced by increased vigilance within the home. There may, however, exist within such an area one or more institutions, schools, infirmaries, or the like, in which the aggregation of many persons, and a system of communal feeding, will greatly increase the chances of contact infection. It is arguable that the vaccination of the inmates of such institutions, when the original epidemic has become quiescent, would significantly reduce the risk of fresh infections at a later stage.

PROPHYLACTIC IMMUNISATION WITH AN ANTITYPHOID SERUM

So far we have been discussing active immunisation with an antityphoid, or T.A.B., vaccine. The studies of Felix and his colleagues on the Vi antigen of the typhoid bacillus, and on the corresponding antibody, have reawakened interest in the use of an antityphoid serum for therapeutic purposes, and promising, if as yet inconclusive, results have been recorded (Felix and Pitt 1934, Felix 1935). Experiments carried out during these studies have shown quite clearly that a suitable antiserum, used as a prophylactic agent, will protect mice against a lethal dose of virulent typhoid bacilli. There are, so far as I know, no records of the prophylactic use of an antityphoid serum in man; and those who attach little or no value to the results of experiments in animals may regard it as premature to discuss the indications for the practical applications of this procedure. Since this view is not shared by all, it seems of interest to note that the conditions that tell against the use of antityphoid vaccination during an epidemic prevalence are exactly those that favour passive immunisation with an effective antiserum.

If all those living in the area served by a polluted water-supply received a prophylactic injection of a specific antiserum immediately the pollution was discovered, the injection being repeated 14–21 days later, it seems probable that a significant degree of protection would be afforded for a total period of some six weeks or more—that is, throughout the period of maximal risk. By the time the passive immunity had waned, the risk would have become slight, or negligible. I should guess, though one can do no more than guess until a trial has been carried out under field conditions, that the number of cases and deaths might in this way be very greatly reduced. If we admit arguments from analogy, as well as from animal experiments, this guess is rendered somewhat more probable by the success that has attended the use of convalescent or adult serum in the protection of measles contacts. In any case we shall be using a method that may perhaps do much good, while it is very unlikely to do harm; and this would seem to be a sufficient reason for urging an adequate trial when the next emergency occurs. It should, perhaps,

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be added that the probable occurrence of a certain number of cases of serum sickness must be taken into account.

It is hardly necessary to add that passive immunisation with a specific antiserum would be an entirely unsuitable procedure in those conditions which are most favourable to active immunisation with a T.A.B. vaccine—armies or individuals proceeding from uninfected to infected areas, labour communities living in an endemic area with defective sanitation, or those exposed to particular risks of contact infection during the aftermath of an epidemic. In all such cases a long-lasting immunity is required. In the remaining situation that we have considered, that of contacts of primary cases under the conditions dealt with by Ramsey (1935), passive protection with a specific antiserum is at least worth a trial, since, as a matter of experience, the great majority of contact infections are contracted during the period in which it would still exert its effect.

RELATION OF ACTIVE OR PASSIVE IMMUNISATION TO OTHER MEASURES OF CONTROL

Although the main purpose of this paper has been to discuss the rôle of active or passive immunisation in the prevention of enteric infection, the importance of other factors has been frequently stressed; and, in conclusion, it will be well to emphasise this aspect of our problem in relation to those water-borne, or milk-borne, epidemics with which we have been mainly concerned.

It is not within the province of a bacteriologist to discuss, in any general way, the administrative measures which should be employed to prevent accidents of this kind; but it is permissible to note a few points which depend directly on bacteriological control. So far as water-supplies are concerned there are strong arguments in favour of the view that continuous bacteriological control should be a routine procedure; and "continuous" means that samples should be examined daily, except perhaps in certain areas in which the possibility of excretal pollution can be almost excluded. Even here, the added safeguard would be highly desirable. In such daily tests a simple examination for the presence and number of coliform bacilli would meet all essential requirements. More complete examinations should be carried out at longer intervals. Any supply that is shown to be liable to pollution should be adequately and continuously treated, and the treatment should be bacteriologically controlled.

In regard to milk-borne epidemics there is a growing body of opinion that the bacteriological and epidemiological evidence now available has established a clear case for the compulsory pasteurisation of all milk-supplies. This measure would reduce the incidence of many infections in addition to enteric fever.

It should be noted that polluted water may exert its effect, as at Bournemouth, by the secondary pollution of milk. It is clear also that, in any district in which a major outbreak has occurred, the chances of the infection of milk by a carrier will, for some months at least, be considerably increased. A wise precaution, for the protection of the residents within such a district, would be the pasteurisation of all milk-supplies, or the boiling of all milk that cannot be pasteurised.

Finally, it may be doubted whether the lesson of the importance of the typhoid carrier, so clearly and fully demonstrated in the monograph of Ledingham and Arkwright (1912), has been adequately learned. Administrative action must, of course, be limited by practical possibilities, and the detection and control of every carrier is well outside these limits. But there are certain persons—those for instance who are engaged in the processing of milk, or in the handling of foodstuffs on a major scale, or in public waterworks—whose inadvertent and unfortunate potentialities for harm are so great that it seems reasonable to suggest that employment in such positions shall be given only to those who have been adequately examined and found to be free from those intestinal infections that are readily spread by water, milk, or food.

There is little doubt that an adequate tightening of the bacteriological control of water, milk, and food throughout the country would, with no inconvenience to the public at large, and at a relatively trivial expense, reduce the incidence of enteric infection to a point at which a discussion of the rôle of antityphoid vaccination would become, at least for the stay-at-homes among us, of academic interest.

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NORMAL VENTRICULOGRAMS IN TUMOURS OF THE CEREBRAL HEMISPHERES

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THE value of ventriculography as an accessory method in the diagnosis of intracranial tumours has now become generally accepted. By means of it also much has been added to our knowledge of atrophic and degenerative processes affecting the brain, and of some sequels of head injury, notably cerebral cicatrices; in the latter group particularly, ventriculograms often reveal deforming lesions which can be dealt with surgically. The method has been no less valuable in excluding space-occupying lesions; in many suspected cases the diagnosis of tumour can be confidently dismissed on the evidence afforded by ventriculography. This applies especially to cases of headache, epilepsy, and mental changes in which the possibility of brain tumour arises.

So much has modern neurological diagnosis come to rely upon the method that we consider it of interest to record four cases of cerebral tumour in which the ventriculograms were normal, or were considered to be so by all the radiologists, neurologists, and neurosurgeons who examined them. It will be seen that in each case, ventriculography was done at a stage when the tumour had already produced well-

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marked physical signs, although in two there was no papilloedema and the lumbar cerebro-spinal fluid pressure was normal.

THE CASES

CASE 1.—*Right fronto-parietal glioma (astrocytoma) with normal ventriculogram.*

L. G., a joiner aged 47, was admitted to the London Hospital on March 2nd, 1936, under the care of Dr. Russell Brain. He had been in good health until 3½ months before admission, when he began to notice a slight weakness of the left hand and foot, and shortly afterwards a feeling of numbness and coldness in those members. These symptoms had been slowly progressive until his admission to hospital. He had had no headache, visual disturbances, or epileptic attacks.

On examination he had a left hemiparesis, affecting the hand and forearm most, the lower limb to a less degree, and the lower part of the left side of the face only slightly. There was moderate wasting and flaccidity of the left forearm and hand. The tendon reflexes were slightly brisker in the left limbs than in the right, the left abdominals were diminished, but the left plantar response was flexor while the right was extensor. There was slight relative anæsthesia in the left side of the face, and impairment of postural and discriminative sensibility in the left hand and foot. No other abnormal physical signs were elicited. Both optic discs were normal, and the visual fields were full. The cerebro-spinal fluid pressure on lumbar puncture was 110 mm. The fluid contained two cells per c.mm. and 0·035 per cent. protein. Encephalography with 60 c.cm. of air outlined the ventricles fairly well. The axial views (Fig. 1) showed small symmetrically placed ventricles with no deviation of the septum pellucidum, and the lateral projections did not reveal any significant abnormality.

The patient was not severely incapacitated by the hemiparesis, and, as he improved subjectively with rest in bed, he was discharged to the out-patient department for observation. He remained well for several months, with perhaps a slight increase in the hemiparesis; he then began to suffer from headache and to have epileptic attacks. He was readmitted in November, 1936, 8 months after his first admission. The left hemiparesis was certainly more pronounced, both plantar responses were extensor, and there was impairment of all forms of sensibility down the left side of the body. In addition there was early papilloedema and complete left homonymous hemianopia. While awaiting operation he died suddenly on Nov. 24th, 1936.

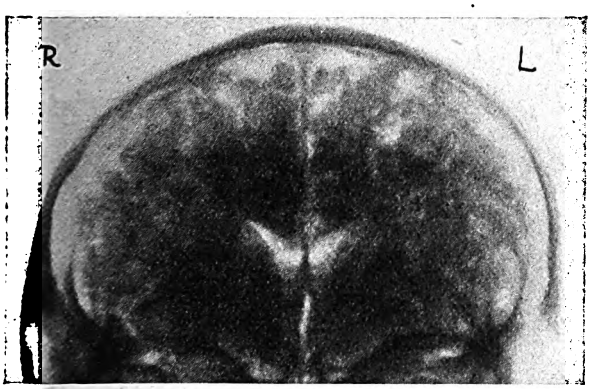

FIG. 1 (Case 1).—Anteroposterior encephalogram. Right parietofrontal tumour.

Necropsy disclosed a large ill-defined infiltrating glioma involving the greater part of the right parietal lobe, extending into the right frontal and temporal lobes (Fig. 2). The septum pellucidum was slightly displaced to the left, but despite the large size of the tumour, the right lateral ventricle was not obliterated, nor even much smaller than its fellow. The tumour was an astrocytoma, in parts of which anaplastic changes were apparent.

The second case is of a similar nature, differing however in the situation and pathology of the tumour.

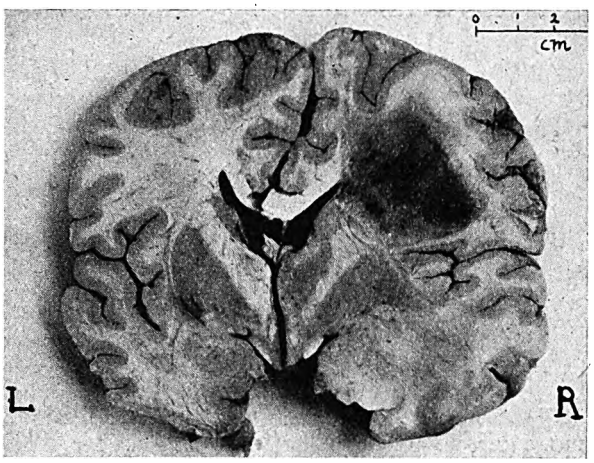

FIG. 2 (Case 1).—Coronal section of cerebral hemispheres.

CASE 2.—*Left frontal glioma (spongioblastoma multiforme) with normal ventriculogram.*

C. J., a man of 57, was admitted to the National Hospital, Queen-square, on Jan. 15th, 1934, under the care of Dr. W. J. Adie. He had been in good health until 10 months before admission when he had had a generalised epileptic seizure in which he was unconscious for about 1½ hours. This attack left no sequelæ, and he was quite well until 6 weeks later when he had a second one. Thereafter luminal seemed to control the attacks, and for 8 months he remained quite free from symptoms. In December, 1934, there were three episodes in which for several hours he was aphasic and did not have the proper use of his right arm. For some time there had been a slight failure of his memory, but otherwise his intellect was unclouded. He had not suffered from headache, vomiting, or visual disturbances.

He was a healthy looking middle-aged man, and gave a clear and intelligent account of his symptoms. No speech disturbance was apparent. Both optic fundi were normal. There was slight weakness of the lower part of the right side of the face on involuntary movement. The right side of the tongue and soft palate were slightly weaker than the left. The neurological examination otherwise was normal except for the fact that the right ankle-jerk was slightly brisker than the left, and the right plantar response was not as definitely flexor as the left. He had a high blood pressure, 220/115. Radiograms of the skull were normal. On lumbar puncture the cerebro-spinal fluid pressure was 150 mm., and the fluid contained one cell per c.mm. and 0·06 per cent. protein. The colloidal gold curve was normal, and the Wassermann reaction negative.

Shortly after admission he began to have numerous focal epileptic attacks, consisting of sudden tonic contraction of the right side of the face, starting at the angle of the mouth, with deviation of the tongue to the right. This was followed by clonic contractions of the right side of the face and of the temporal and masseter muscles. Each attack lasted about a minute, and there was no loss of consciousness, nor spread of the attack to any other part of the body. During the attack he could understand spoken and written speech, and could write but was unable to speak, probably because of the contractions of the face and tongue. When the attack ceased there was no aphasia, but there was a slight slurring of speech due to post-epileptic paralysis of the face and tongue.

On Feb. 8th Mr. Julian Taylor did a ventriculogram, which showed symmetrical disposition of normal-sized ventricles and no shift of the septum pellucidum (Fig. 3). Thereafter the attacks subsided, and as he was virtually free from symptoms he was allowed to go home for observation as an out-patient. He was next seen in July, 1935, when he was found to be very drowsy, and to

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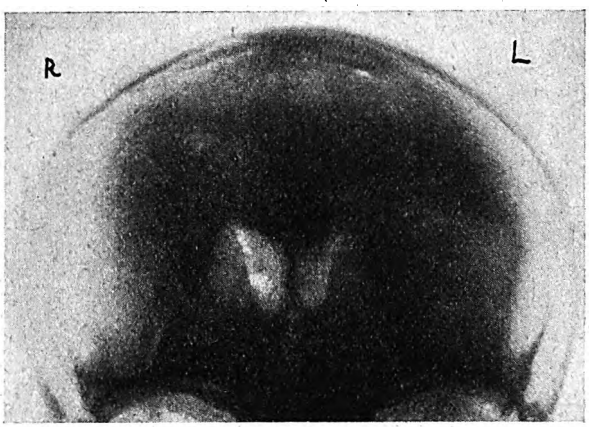

FIG. 3 (Case 2).—Anteroposterior ventriculogram. Left frontal tumour.

have bilateral papilloedema and right hemiplegia. He died on July 23rd, 1935.

At *necropsy* there was a large solid tumour measuring 5 by 5 by 2 cm. in the posterior and inferior part of the left frontal lobe, occupying the grey and white matter. It presented on the surface of the brain in the posterior part of the second and third frontal convolutions, where it was adherent to the dura over an area about 2 cm. in diameter. The bed of the tumour showed compression, suggesting that in part the tumour had pushed the cortex before it, as a meningioma does. Elsewhere the tumour appeared to be continuous with the brain, and in places to infiltrate the leptomeninges. The cut surface of the tumour showed extensive central necrosis with diffuse hæmorrhages; the more superficial parts were granular and white. There was moderate œdema of the surrounding white matter. The left ventricle was compressed and the ventricular system as a whole moderately displaced to the right side (Fig. 4).

Histologically the tumour was a spongioblastoma multiforme.

The following are brief reports of two further cases of cerebral tumour in which the axial views of the ventriculograms were normal. These cases do not provide such strong evidence of "normality" as the first two because the filling of the ventricles with air was not complete enough to outline the ventricles properly in the lateral projections.

CASE 3.—W. H., a bank clerk aged 27, was admitted to the London Hospital under the care of Dr. R. A. Rowlands on Dec. 20th, 1932. His previous health had been good, but in 1928 he had complained of vague afternoon headaches which were ascribed to eye-strain. These had ceased entirely after a few weeks and he remained well until Oct. 5th, 1932, when he woke up in the morning with a severe throbbing headache, worst in the left temple and above the left ear. He vomited several times, and from then until his admission to hospital headache and vomiting had been his only symptoms.

His intellect appeared to be normal and there was no dysarthria or aphasia. There were three dioptres of papilloedema in each eye. The neurological examination otherwise was negative. An encephalogram was done on Jan. 15th, 1933, but after 12 c.cm. of air had been injected the patient collapsed and the insufflation had to be stopped. Axial projections (Fig. 5) showed ventricles of apparently normal size, symmetrically disposed to the middle line, with no shift of the septum pellucidum. On the following day an exploratory craniotomy failed to reveal a tumour and he died four days later.

At *necropsy* a large cystic and solid tumour was found in the left frontal lobe, measuring 6·5 cm. from before backward, 4·5 cm. from side to side, and 3·8 cm. from above downward. It extended from within 0·5 cm. of the frontal pole backwards to invade the anterior horn of the left ventricle. Coronal sections of the hardened brain showed that the septum pellucidum was only slightly displaced to the right in its anterior part, the bodies of the lateral ventricles appeared to be symmetrical, and the third ventricle was small and in the middle line. Histologically the tumour was a spongioblastoma multiforme.

CASE 4.—A. M., a woman of 26, was admitted to the London Hospital under the care of Mr. Hugh Cairns on Feb. 20th, 1937. She had been in perfect health until Feb. 2nd, when she had had a generalised epileptic attack preceded by a feeling of "prickling" in the right upper limb. This attack left no sequels, but three days later she had another which left her with a severe occipital headache. The headache lasted for five days and then disappeared suddenly and completely. From that time until admission to hospital, she remained free from symptoms.

She looked healthy and said that she felt perfectly well. Both optic discs were hyperæmic, but there was no measurable swelling, hæmorrhage, or exudate. She had slight right lower facial weakness, and her tongue was protruded slightly to the right. She was not as quick and accurate in purposive tests with the right upper limb as with the left, but there was no apparent weakness or dystonia. Her right lower limb showed slight generalised weakness. The tendon reflexes were equally brisk on the two sides, but the right abdominal reflexes were absent, and the right plantar response was extensor, while the left was flexor. There was a slight defect in postural and discriminative sensibility in the right upper and lower limbs. The examination otherwise revealed no abnormality. Radiograms of the skull were normal. The cerebrospinal fluid pressure on lumbar puncture was 250 mm. and the fluid contained one cell and 0·04 per cent. protein.

Ventriculography on March 1st, 1937, one month after the onset of symptoms, showed in the axial views ventricles of normal size and symmetrical disposition (Fig. 6). The filling was not adequate to outline the ventricles satisfactorily in the lateral projections. As she was free from symptoms, and as a cortical exploration in the suspected (parietal) site would have probably given rise to a considerable sensory disability, she was discharged for

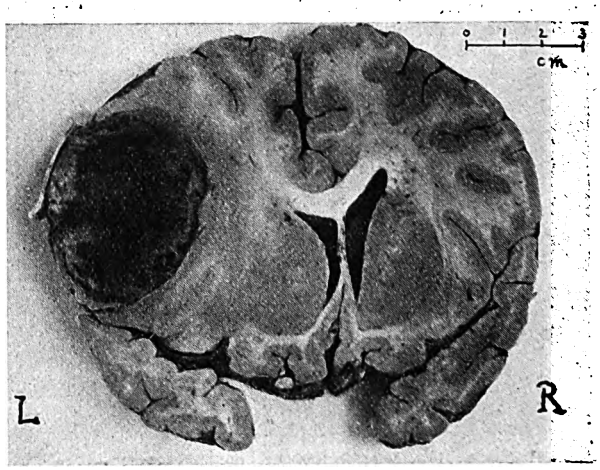

FIG. 4 (Case 2).—Coronal section of cerebral hemispheres.

observation. She was seen 3 months later, when the physical signs were only slightly more marked than at the previous examination and she had had no further attacks and felt perfectly well. A week after this interview she died suddenly in another generalised convulsion, on June 16th, 1937.

At *necropsy* there was a small cystic and solid tumour, measuring 3 by 3 by 2 cm., in the white matter of the left parietal lobe 2 cm. from the surface. There seemed to be no œdema around the tumour nor any hæmorrhage into it, and there was no obvious reason why the tumour should have produced this rapid death. Histologically it was an astrocytoma.

DISCUSSION

The interpretation of abnormal ventriculograms is often a matter of some difficulty even to the most

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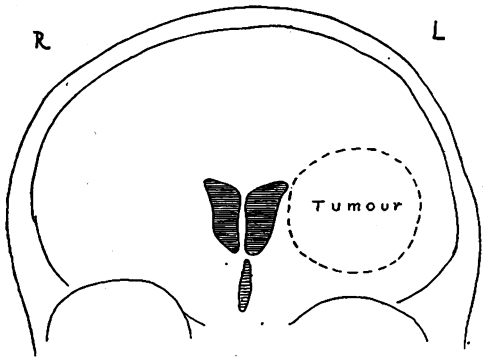

FIG. 5 (Case 3).—Tracing of encephalogram. Size and site of tumour indicated.

expert examiner. A normal ventriculogram has certain clearly defined and easily recognised features which rarely give rise to any difficulty in interpretation. Generally a good antero-posterior view gives the most information (Fig. 7A–D): (A) the bodies of the two lateral ventricles are seen in cross-section as dark triangular shadows of symmetrical size and disposition; (B) on each of these is imposed a fainter and larger shadow which represents the anterior horn of the ventricles; (C) in addition a small shadow can often be seen at some distance below and lateral to each body, representing the tip of the temporal horn; (D) the third ventricle appears as a narrow slit below and between the two lateral ventricles, exactly in the middle line. This normal antero-posterior projection is so constant that we are rarely content to explain a departure from it as an anatomical variation. To outline each part of the ventricular system satisfactorily in lateral projections it may be necessary to manipulate the head and to take views in several different positions. This is a technical

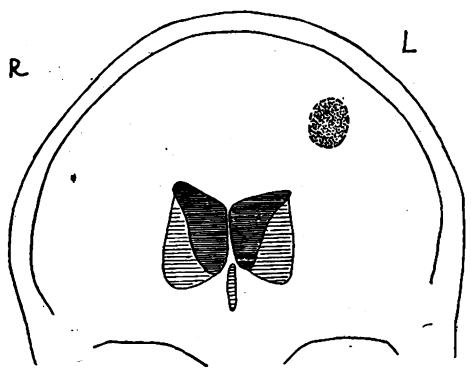

FIG. 6 (Case 4).—Tracing of anteroposterior encephalogram indicating size and site of tumour.

question which need not be discussed here, and depends entirely on physical principles governing the behaviour of two media of different density in a closed system.

Our use of the term "normal" ventriculogram with reference to the above cases thus demands some explanation. With improvement in the technique of air injection a good profile of the lateral ventricles can usually be pieced together from several lateral projections, but in the past this has not always been possible and most reliance has been placed on the axial views and especially the anteroposterior projection. And, since it is a matter of common observation that at necropsy in all hemisphere tumours there is some displacement of the septum pellucidum and some disturbance of the symmetry of the ventricles, ventriculograms which have shown no such displacement or asymmetry in the axial views have been regarded as indicating that no tumour of the hemisphere could be present. Experience of the above cases, however, shows that this opinion is no longer tenable.

In an effort to explain the absence of displacement or deformity of the ventricles in the cases described above, the first possibility which presents itself is that in each case the ventriculograms were done at a stage when the tumour was too small to be expected to produce any effect on the ventricles. In Case 1 we have no means of estimating the size of the tumour at the time of the ventriculogram, but at necropsy 5½ months later a large tumour occupying nearly half of one hemisphere had produced very little abnormality of the ventricular system. In Case 2, on the other hand, the coronal sections of the brain fixed after death showed a large tumour

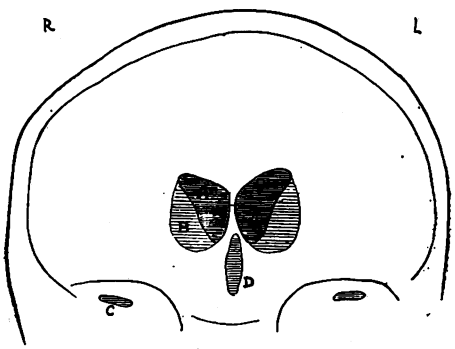

FIG. 7.—Tracing of normal encephalogram (see text).

producing a shift in the system which would undoubtedly have been apparent had another ventriculogram been done when signs of increased intracranial pressure began to manifest themselves. The tumour in this case, however, was in a most eloquent part of the cortex, and presumably declared itself, in focal epileptic discharges, before it had attained any great size, and before it had produced any ventricular displacement. In Case 3 the ventriculogram was done only five days before death and at necropsy the tumour proved to be a large one, measuring 6·5 by 4·5 by 3·8 cm. In Case 4 the ventriculogram was done four months before death, and the tumour in this case was quite small even at the time of death, measuring only 3 by 3 by 2 cm.

Thus it is seen that while the "normality" of the anteroposterior ventriculogram may sometimes be accounted for by the small size of the tumour, as in Case 4, in other cases the symmetry of the ventricular system is distorted little or not at all by quite large tumours of the hemisphere. There is a corresponding variation about the clinical picture; a small tumour may produce a great increase of intracranial pressure and gross disturbance of function, whereas a massive tumour may give rise to little increase of pressure and only minimal signs on examination.

These cases are quite exceptional since most tumours of similar size produce gross distortion of the anteroposterior ventriculograms. Even much smaller tumours may produce significant alteration of the normal appearance. Fig. 8 shows the anteroposterior ventriculogram in a case of parasagittal Rolandic meningioma that measured only 3 by 1 cm. The ventricles are seen to be displaced to the opposite

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side, although the tumour was not only small but also situated on the surface of the brain at a great distance from them.

It is evident that ventricular deformity or displacement may be produced not only by the actual bulk of a tumour but also by œdema of the brain surrounding the tumour. The presence of œdema would account for the displacements which are sometimes met with in small tumours, and its absence

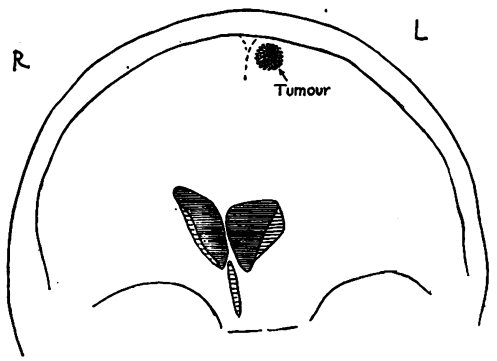

FIG. 8.—Tracing of encephalogram in a patient with a small parasagittal meningioma.

might explain the normal ventriculograms in our first two cases in which at the time of ventriculography the clinical picture was one of focal signs and symptoms with no clinical or manometric evidence of increased intracranial pressure.

Is the absence of lateral displacement of the ventricles in these cases referable to a particular pathological type of tumour? Our material is obviously too scanty for a conclusive statement, but it is interesting to note that all of our cases were invasive gliomata. Two were astrocytomata, one of these anaplastic, and two were spongioblastomata. They were tumours of varying degrees of malignancy but they differed histologically in no notable respect from other gliomata which do produce ventricular deformity.

It might have been expected that the ventricular deformity would be least with meningiomata since their growth begins so far from the ventricles, but in fact, as shown above, considerable displacement was found with a meningioma which was both smaller and farther removed from the ventricle than the gliomata in the four cases reported. It thus appears that a small tumour growing from the meninges, displacing the brain before it, is more apt to produce ventricular deformity than an invasive tumour of the same size growing in the substance of the hemisphere, and infiltrating rather than displacing the brain.

The absence of lateral displacement of the ventricular system with hemisphere gliomata does not appear to be related to any particular location of the tumour: the tumour in Case 1 was chiefly in the parietal lobe extending into the frontal and temporal lobes, in Case 2 in the fronto-temporal region, in Case 3 in the frontal lobe, and in Case 4 the parietal lobe. In each of these sites, ventriculography usually reveals a characteristic deformity or displacement.

From these observations it seems that three factors—size, site, and pathology—may occasionally operate together in such a manner that a cerebral tumour may coexist with a normal ventriculogram. A small infiltrating glioma in an eloquent site may give rise to symptoms and signs before it produces ventricular deformity, and is evidently more likely to behave in this manner than a meningioma of the same size in the same situation. But it is also evident that large diffuse gliomata may occasionally run their whole course, even to the death of their hosts, without producing any gross ventricular deformity.

This report in no way detracts from the value of ventriculography; rather, it serves to emphasise a point which modern medicine occasionally shows a tendency to disregard—namely, that an accurate clinical assessment of the patient is at least as important as accessory aids to diagnosis, and that these two factors are only complementary to one another.

SUMMARY

Four cases of cerebral tumour are reported in which the ventriculograms showed no lateral displacement of the ventricular system, or any other abnormality in the axial projections, at a time when the tumours had already produced well-marked physical signs. These tumours were all gliomata, two of them astrocytomata and two spongioblastomata. Histologically they did not differ from other gliomata which do produce ventricular deformities. Two were chiefly parietal, one frontotemporal, and one frontal in location. In each case the clinical picture was of a progressive neoplastic lesion.

We are indebted to Mr. Hugh Cairns for advice and assistance in the preparation of this paper and for access to his case records, and to the National Hospital, Queen-square for the records and radiograms of Case 2.

INDICATIONS FOR COLLAPSE THERAPY IN PULMONARY TUBERCULOSIS

BY DR. W. BEHRENS
DAVOS PLATZ

ALL treatment of open tuberculosis of the lungs aims at securing for the patient freedom from sputum containing tubercle bacilli. Experience has shown that a persistently positive sputum indicates the presence of a cavity. These cavities, a source both of sputum and hæmorrhage, play an important part in the spread of disease along the bronchial tree, and we must therefore concentrate our efforts on closing them. This can best be done by a clearly defined collapse therapy, systematically carried out.

Before I enter upon my main subject I would like to sketch briefly the effects on the lung of treatment by collapse. One important result of collapse is to give rest to the diseased lung with a decrease in its ventilation and oxygen supply. The circulatory stasis and anoxæmia thus produced in the affected part is believed by some to be detrimental to the survival of the tubercle bacillus and to check the spread of disease. Moreover, it enables the elastic recoil of the lung to come into force thereby greatly accelerating the process of healing which always accompanies shrinkage of the foci. This concentric collapse towards the hilum is of the greatest importance in the healing of cavities.

We are constantly hearing about lungs being well "compressed" by this or that method. The term used in connexion with lung tissue does not express the essential factor in collapse therapy, which is an atony of the whole diseased area achieved by the natural elasticity of the lung. Compression

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by a high-pressure pneumothorax, oleothorax, or plombage is often both unsatisfactory and dangerous.

General Indications

Treatment by collapse was confined originally to unilateral tuberculosis of a mainly cavernous type. It is now recognised that purely unilateral tuberculosis is seldom met with in advanced cases, and recent work has proved that bilateral active lesions can be successfully treated by the most varied methods.

One must not, however, overlook the fact that cavernous tuberculosis of the lungs often shows a surprising tendency to spontaneous cure. The saving of time, which is nowadays very desirable in order to avoid long and costly cures, cannot be absolutely guaranteed by collapse therapy, and the possibility will always remain that some unforeseen complication of the procedure, such as empyema, may lead to a long illness which could have been avoided by patience and forethought at the outset.

Before resorting to collapse therapy careful consideration should be given to the previous course of the disease as well as to the material position and temperament of the patient. Conservative treatment should be tried first and accessory aids used only when simpler methods have failed. It is sometimes desirable to employ collapse early in order to avoid spread of infection to others, especially children.

Special Indications

Only a brief outline of special indications can be given here as clinical details can best be learnt by daily practice and accumulated experience. I shall try to convey first the essential points and to show what, in my opinion, are the indications for pneumothorax, thoracoplasty, plombage, paralysis of the diaphragm, and finally to touch upon the question of combined collapse therapy in relation to other treatment.

ARTIFICIAL PNEUMOTHORAX

Let us suppose that a patient has a cavity in the apex or a recent diffuse infiltration with a positive sputum. His general condition is good but in spite of strict conservative treatment for 2 or 3 months there is no substantial improvement and the disease shows a tendency to spread. Here, I think, one should not hesitate to recommend treatment by artificial pneumothorax in view of the activity and moderate extent of the disease; and, moreover, one can still expect to find the pleural space free from adhesions.

Cessation of activity and healing of the cavity should follow the induction of a pneumothorax. Furthermore, we can count on a satisfactory re-expansion of the lung when the pneumothorax is terminated as obstinate pleural exudates are rare with a cavity in this situation and compensatory expansion of healthy lung tissue will occur. These considerations should be modified according to whether the lesion is in the upper, middle, or lower lobe of the lung.

Let us suppose there are some adhesions. If these are cord-like or limited in extent, thereby preventing adequate collapse, they should be divided by a recognised method after which the pneumothorax can be continued in the usual way. If the adhesions cannot be divided and neither the physician nor the patient is able, for the moment, to decide upon any more drastic measures to increase the degree of collapse, it is advisable to give carefully controlled refills for a few more months, meanwhile imposing strict rest upon the patient.

It often happens, especially in recent cases where the cavity is surrounded by lung tissue capable of functioning normally, that a gradual shrinkage and cicatrisation takes place. The dangers, however, associated with an incomplete pneumothorax and a bacilli-disseminating cavity must not be ignored. It may be that later the patient will have to make up his mind to undergo a thoracoplasty and the decision will be easier for him after the failure of the routine treatment.

In chronic unilateral pulmonary tuberculosis of fibroid type with widespread damage extensive adhesions are common, and such a case is rarely suitable for pneumothorax. Nevertheless, an attempt should be made at induction as we may be agreeably surprised. Quite apart from this it is necessary to be sure that there is an adherent pleural space before deciding upon any other procedure. This investigation is particularly important when considering the advisability of a plombage.

THORACOPLASTY

If we have been compelled to admit that, owing to adhesions, a successful pneumothorax is out of the question then further treatment must be considered.

Let us suppose that a cavity at the apex has remained unaltered or even increased in size. If this is so the possibility of a rib resection arises, the extent of which will depend upon the extent of the disease; if it is confined to the apex an apical or upper lobe thoracoplasty is all that is necessary, whereas, if it extends lower Sauerbruch's paravertebral operation is the one of choice. It behoves us always to take into account the general bodily resistance of the patient. As there is rarely any urgency about thoracoplasty we have ample time to improve the general condition and to assess the operative risk.

Broadly speaking, it may be said that the subject's age should not exceed 50 years or the duration of the illness 10 years, but, of course, there are exceptions. The probability of success may be calculated from various clinical investigations which include the temperature and pulse curves, the estimation of renal function, and especially by repeated readings of the arterial and venous blood pressures. The blood picture should be investigated and a differential white cell count done, as a "shift to the left" of the polymorphs or a lymphopenia are important. These clinical and laboratory data enable us to assess the risks of an operation which have nowadays become much less owing to the adoption of a two- or three-stage procedure.

As contra-indications for thoracoplasty I have already mentioned the patient's age and the duration of the illness, each in consideration of a possible diminished cardiac reserve. Mild diabetes, intestinal and unilateral renal tuberculosis, and other extra-pulmonary foci are not absolute contra-indications but call for experienced judgment. In such cases treatment should be directed first to the intestinal lesion or a nephrectomy performed before venturing on a rib resection. It goes without saying that non-tuberculous complications affecting other organs, especially the heart or kidneys, must be given very careful consideration.

PARAFFIN PLOMBAGE

The patient with a small apical cavity with little surrounding infiltration the size of which does not justify the risks involved in a thoracoplasty is an ideal subject for an extrapleural paraffin plombage. The apex of the lung is freed, by blunt dissection with the index finger, from the inner wall of the thorax and the space so formed packed with paraffin

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to prevent re-expansion. The success of the operation depends on a universally adherent pleura. The induction of a pneumothorax, therefore, should have been attempted in several places before plombage is undertaken. If, however, the cavity is large it will be wiser to perform an apical thoracoplasty as technical difficulties may prevent an adequate collapse, and the large mass of paraffin that will be required may cause trouble by acting as a foreign body.

Paraffin plombage, employed with discretion, is also useful in the treatment of small cavities situated at the apex of the lower lobe which are found posteriorly in the paravertebral region. It will be readily understood that these are difficult to treat by means of a thoracoplasty without sacrificing a large area of lung tissue that is capable of functioning normally.

The so-called *extrapleural pneumothorax* I mention only to complete the list of possible surgical interventions, as it is as yet such a newly introduced method that it is impossible at present to form a true estimate of its value.

OPERATIONS ON THE PHRENIC NERVE

When should one consider that once popular form of treatment—paralysis of the diaphragm? Fortunately the former excessive enthusiasm has somewhat cooled off during the last few years owing to many failures that have impressed doctors and patients alike, and also to the sobering effect of the increasing number of after-complications, such as dyspnœa and cardiac embarrassment.

Not only are the indications now much more limited but the technique of the operation has been modified. In the early days a phrenicotomy after the method of Stürtz—i.e., a simple division of the exposed nerve—was performed. Later, Felix and Sauerbruch suggested the operation of phrenic avulsion in which the greater part of the nerve is removed. During the last few years we have become more conservative and are usually content with either crushing or blocking the nerve trunk with alcohol, thereby producing a temporary paralysis for a few months. This is not always successful but should be done in preference to a permanent paralysis if there is any doubt about the prospects of success of the operation. The operation is used not so much for its compressive effect but rather to allow the diseased portion of the lung to follow its natural tendency to contract.

Paralysis of the diaphragm is indicated as an independent measure in lower lobe tuberculosis. Cavities in the middle zone, especially laterally, can be favourably influenced, and there are physicians who prefer in these cases phrenic avulsion to pneumothorax with its long course of treatment. One cannot deny that sometimes recent infraclavicular cavities disappear after paralysis of the diaphragm, or may be so reduced in size that they can be more easily closed by an additional operation such as a small thoracoplasty or plombage. It is also indicated when the age of the patient, disease in other organs such as the kidney, or the patient's attitude, makes a major operation impossible. To complete the list it should be mentioned that paralysis of the diaphragm has been used successfully after a thoracoplasty or a pneumothorax has failed to effect complete collapse.

BILATERAL COLLAPSE

So far I have dealt principally with unilateral pulmonary tuberculosis. What treatment should be adopted when there is disease in both lungs and a long conservative "cure" has been unsatisfactory? All I can say definitely is that we have to arm ourselves with untiring patience and often to be content with only a partial restoration of the patient's capacity for work.

Clear indications for collapse treatment are found in only a limited number of cases. The problem is still in a state of flux and has to be solved differently according to the experience and capabilities of the individual doctors concerned.

A few interesting facts may, however, be mentioned. For instance, we sometimes find in a patient whose general condition is good that after a successful collapse has been established on the most advanced side, there is a remarkable and unexpected improvement in the activity of the other side, which may even amount to a complete cure. There have been cases where a bilateral pneumothorax, previously considered necessary, was rendered superfluous by the success of the first pneumothorax performed on the most affected side; improvement in the collapsed lung is accompanied by a disappearance of cavities on the opposite side although they had previously resisted a strict rest cure of many months. Again, small apical cavities on the relatively sound side are not an absolute contra-indication for a thoracoplasty on the opposite side, for it has been noticed that such cavities may heal completely when this treatment is successfully undertaken. For these reasons alone caution is advisable, and its necessity is still more impressed upon us when we consider the possible sequelæ of an over-enthusiastic intervention on both lungs.

The clearest indication for a double pneumothorax is recent bilateral cavernous tuberculosis of moderate extent. Even so, it is wise first of all to treat the side on which the disease is more advanced and to establish a satisfactory condition there before undertaking the pneumothorax on the other side. When once the disease is advanced adhesions have naturally to be reckoned with and they can be a serious complication. In a febrile patient with extensive tuberculosis there are likely to be foci under the pleura which may lead to exudation and other complications such as perforation and empyema.

There is another point that deserves attention. Occasionally a patient with an established pneumothorax on one side develops a fresh outburst of activity in the good lung which, despite conservative treatment, progresses to cavity formation. In such a case, so long as the fresh lesion is limited in extent, there should be no hesitation in establishing a second pneumothorax.

When there are massive adhesions obliterating the pleural cavity a few selected cases can be successfully treated by a double plombage or apical thoracoplasty. Such an operation on one side does not preclude the possibility of treatment by pneumothorax or an apical plombage on the opposite side.

I am purposely abstaining from giving any further particulars owing to the lack of sufficient statistics of permanent cures which, after all, are the only criteria in judging the success of these risky and severe measures.

Conclusions

In reviewing the present-day indications for collapse therapy it must be admitted that they have been considerably extended in the last ten years. I doubt, however, whether the high hopes held out have been justified by later results. The more cases one observes and the more one is able to keep in touch with former patients the more one feels obliged to be cautious in expressing an opinion. By saying

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that, I do not mean in the least to deny the many fine results obtained.

The management of an apparently straightforward ambulatory pneumothorax is not so simple as it is said to be and, above all, requires considerably more individual treatment than is generally supposed. A successful operation does not justify us in regarding the tuberculosis as having been overcome, for relapses speak only too clearly to the contrary.

Conservative treatment, especially a strict rest-cure, continues to be the foundation of all treatment of tuberculosis. This, I think, is the conclusion reached by every unprejudiced physician if he carefully examines the results obtained in his own experience.

I am much indebted to Dr. N. L. Rusby for his help in the arrangement and phrasing of this paper.

SERUM REACTIONS AFTER INJECTION OF CONCENTRATED THERAPEUTIC SERUM

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In recent years the practice of concentrating therapeutic sera has been generally adopted. The consequent reduction in bulk and amount of protein injected has resulted in a lower incidence of reactions attributable to the presence of foreign protein.

Table I shows a comparison of the incidence of the main signs of serum reaction after injection with whole and concentrated diphtheria antitoxic serum.

TABLE I—INCIDENCE OF REACTION WITH CONCENTRATED ANTIDIPHTHERITIC SERUM

Author.	Type of serum.	No. of cases in series.	Percentage incidence in cases treated.		
			Rash.	Joint pains.	Œdema.
Goodall (1928)..	Whole.	8726	40·1	4·3	—
Rolleston (1929)	„	1472	66·4	9·3	—
M.A.B. report (1928–29)	„	711	44·3	4·19*	1·25
	Concentrated.	323	15·7	0·41*	0·3
Hunt (1932) ..	„	2859	28·1	—	—
Present investigation ..	„	4835	17·3	0·33	0·35

* Figures taken from a comparable series.

Since the incidence of serum reactions is still quoted from figures for unconcentrated serum, it might be of interest to study a series of cases given the concentrated serum now in use. These were found in a series of 4835 consecutive (non-fatal) cases of diphtheria treated at the North-Western (L.C.C.) Hospital during the five-year period 1929–33 with concentrated and refined serum as prepared for the Council's hospitals at their antitoxin establishment (Belmont Laboratories).

INCIDENCE AND MANIFESTATIONS

For the purpose of this analysis serum reaction is interpreted as including any reaction that may be attributed to the injected serum, apart from the immediate thermal reaction of intravenous therapy.

Serum reactions are divided into:

General reaction.—Results of reaction due to circulating serum, including rashes occurring apart from the site of injection and signs such as fever, œdema, and arthritis which may occur in the absence of a rash.

Local reaction, where the rash is limited to the site of serum injection.

Albuminuria, which is accepted as a sign of serum reaction when appearing during the potential period of reaction to serum injection and in the absence of other causes.

The following is an analysis of the cases:—

Total of cases			4835
Total cases showing serum reaction			1061
Percentage of serum reaction			21·9
„ general reaction		(845)	17·5
„ local reaction only ..		(142)	2·9
„ albuminuria only		(74)	1·5

ASSOCIATED FACTORS

Age and sex.—Serum reactions occurred with greatest frequency in the 0–5 year age-group. There was no difference in sex incidence (males 17·1 per cent., females 17·8 per cent. in this series).

Dose.—The amount of serum injected had a noticeable influence on the incidence of serum reaction, high dosage being accompanied by an increase as illustrated by Table II.

TABLE II—PERCENTAGE OF SERUM REACTIONS IN 4835 CASES

Age-groups in years.	Dose of serum.		
	Under 8000 units.	8–24,000 units.	Over 24,000 units.
	%	%	%
0– 5	6·8	38·4	43·1
5–10	4·3	28·7	28·5
10–15	4·8	29·4	46·1
Over 15	3·3	28·6	31·4
Total	5·1	31·7	36·0

Note.—Figures refer only to those cases showing evidence of general reaction.

Previous serum injection was also an important factor in determining the occurrence of serum reaction. Thus of 4662 patients with no history of previous serum injection 16·4 per cent. developed general serum reaction, whereas of 173 patients who had received previous serum 47·4 per cent. showed reaction, a threefold increase. Of the cases receiving reinjection of 24,000 units or more, no fewer than 66·7 per cent. developed reaction.

Route.—The effect of intravenous therapy was not so great, an increase of only 4 per cent. being noted where part of the dosage of 24,000 and more was given by this route compared with the similar group treated by the intramuscular route only.

Variation in serum.—The percentage of reaction in each of the five-yearly periods ranged from 14·1 to 21·8. Since this difference did not depend on the number of cases reinjected with serum or receiving high dosage, it is concluded that batches of serum vary in power to produce reaction.

Asthma in the history was not a factor in producing serum reaction in this series. It was recorded in 15 cases (no type specified), two of which developed general reaction—a rate of 13·3 per cent. Two other cases showed local serum reaction only.

GENERAL REACTIONS

There were altogether 845 general serum reactions in the series.

Incubation period.—The average day of occurrence of the reaction was the eighth after injection, the greatest number of cases showing an incubation

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period of 8–10 days (span 1–52 days), the day of injection being counted as the first. Previous serum injection shortened the incubation period in the majority of cases, reducing the average day of occurrence to the sixth.

TABLE III—INCUBATION PERIOD

Incubation period (days).	Number of cases.		
	No previous serum.	Previous serum.	Total.
1– 3	22	16	38
4– 6	104	47	151
7–10	428	18	446
11–14	157	—	157
15–21	45	—	45
22–30	5	—	5
32	1	—	1
39	1	—	1
52	—	1	1
Total	763	82	845

TABLE IV—DATE OF REACTION

Type of cases.	Day with most reactions.	3-day group with most reactions.	Length of incubation period.		
			Under 7 days.	7–14 days.	Over 14 days.
			%	%	%
No previous serum ..	8th	8–10th	16·5	76·7	6·8
Previous serum ..	6th	5–7th	76·8	22·0	1·2
Combined total ..	8th	8–10th	22·4	71·3	6·3

As originally defined by von Pirquet and Schick (1905), an immediate serum reaction is one occurring within 24 hours of injection, and an accelerated reaction appears from the second to sixth day. After first injections of serum 1·05 per cent. of cases showed immediate reaction and 15·5 per cent. reaction of the accelerated type. When serum was reinjected, after an interval of more than 10 to 14 days an incidence of 7·3 per cent. immediate and 69 per cent. accelerated reactions occurred. Few cases have been recorded that present signs of serum reaction after an interval of longer than four weeks. There were 3 of these in this series, diagnosed in the absence of other known cause. The first developed general urticaria, accompanied by fever and œdema of the face, on the 32nd day after serum injection. In two other cases urticaria of a mixed type appeared on the 39th and 52nd days subsequent to injection of serum.

Duration.—In over 80 per cent. of cases serum reaction was completed within 48 hours; but in a few instances it was prolonged, the maximum duration being 9 days. Previous serum injection tended to shorten the period of reaction.

RASHES

Three main types of rash occur in serum reactions—urticaria, erythematous (including scarlatiniform), and morbilliform. In this series rashes have been subdivided into five groups and Table V shows their relative frequency and difference in incubation period. Urticaria was by far the most often met (80·1 per cent. of total rashes). Circinate rashes tended to appear late and the polymorphous type in less than 10 days, but no one type was limited to a particular period of incubation.

TABLE V—ANALYSIS OF 861 RASHES OCCURRING IN 837 CASES

Rashes. Type.	Incubation period in days.			
	—	1–6	7–12	Over 12
	Per cent.			
Urticaria	80·1	13·5	73·0	13·5
Circinate urticaria	0·6	—	20·0	80·0
Scarlatiniform and unclassified erythema	9·5	12·2	72·0	15·8
Morbilliform	8·1	11·8	69·6	18·6
Polymorphous	1·2	30·0	70·0	—

Recurrent rashes developed in 2·4 per cent. of general serum reactions. They appeared with greater frequency in females of the younger age-groups and in cases that had received previous serum injection. In 19 cases in this series two, and in one case three, separate reactions were noted, and 3 additional cases developed two distinct types of rash simultaneously. The incidence of recurrent rashes was not confined to any particular batches of serum, being scattered throughout the series, and was evidently due to individual idiosyncrasy in the patient.

OTHER REACTIONS

Œdema of the face and hands was recorded in 2 per cent. of general reactions, was twice as common in males as in females, and tended to occur in the lower age-groups and in reinjected cases. High dosage and intravenous therapy were not factors in its causation.

Arthritis or joint-pains occurred in 1·9 per cent. of general reactions, 50 per cent. of cases being adult and all female in this series. It was also more prevalent in reinjected cases.

Arthritis or œdema may develop as the result of serum injection without an accompanying rash (0·95 per cent. of reacting cases).

Fever.—3·4 per cent. of general reactions developed pyrexia of a mild degree (up to 102° F.). This sign appeared most frequently in females of the younger age-groups, previous serum injection having no effect upon its incidence.

Adenitis is rare and was only noted in 0·2 per cent. of this series. The two cases were treated with the same batch of serum.

Neurological complications.—No case was recorded in this series.

Local serum rash limited to the site of injection may be the only evidence of reaction to the foreign protein, or it may precede or accompany a generalised rash, which it tends to resemble in type.

Albuminuria, which may be accepted as a serum phenomenon, occurred in 2·8 per cent. of all cases treated with diphtheria antitoxic serum and was present in 13 per cent. of all cases of reaction. It appeared most often 6–12 days after serum injection and in the majority lasted less than six days.

Thermal reactions directly after intravenous injection cannot be regarded as serum reactions and have no relation to the rare acute reactions, accompanied by dyspnœa, that occur in horse-allergic individuals and are similar in mechanism to anaphylaxis in animals. Reactions of this type have been recorded after many types of intravenous injection and are due to shock following the introduction of a foreign substance into the circulation.

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In this series 6 of the 145 cases treated by intravenous therapy (4·2 per cent.) were recorded as developing immediate rigors, accompanied by slight pyrexia and occasional cyanosis but no dyspnœa. In each instance the serum dosage was above 24,000 units, and 5 of the 6 cases later developed general serum reaction. None had received previous serum injection or gave any history of allergy. Mild degrees of chill were of more frequent occurrence.

"*Serum accidents.*"—The occasional severe and rarely fatal reaction seen in allergic individuals subsequent to serum injection did not occur in this series, although 3·6 per cent. of the cases had received previous serum injection and 0·31 per cent. gave a history of asthma.

SUMMARY

An analysis is presented of the incidence and manifestations of serum reaction occurring in a series of 4835 cases treated with concentrated diphtheria antitoxic serum.

General serum reaction developed in 17·5 per cent. of all cases treated, and if local reaction and albuminuria are included the figure was raised to 21·9 per cent.

The main factors responsible for increasing the incidence of serum reactions are high dosage, necessitating the introduction of greater amounts of foreign protein, sensitivity to serum due to previous injection of serum, and the variation in power of different batches of serum to produce reaction.

An account is given of the incubation period, duration, and manifestation of 845 general reactions that occurred in this series. The most frequent day of occurrence was the eighth after injection, but in reinjected cases this was reduced to the sixth. In over 80 per cent. of cases the reaction was mild, being completed within 48 hours.

Five types of rash are recorded, 80·1 per cent. of the total rashes being urticarial and 9·5 per cent. erythematous and scarlatiniform. Recurrent rashes occurred in 2·4 per cent. of general reactions. Œdema of face and hands developed in 2 per cent., joint-pains in 1·9 per cent., and mild pyrexia in 3·4 per cent. of general reactions.

Albuminuria, which may be accepted as a serum phenomenon, occurred in 2·8 per cent. of all treated cases and was present in 13 per cent. of serum reactions.

Immediate thermal reactions following intravenous injection were not regarded as serum reactions.

No case of severe or fatal reaction to serum injection occurred in this series.

CONCLUSION

Concentrated horse-serum used for the treatment of diphtheria rarely causes any anxiety from possible serious developments, though it may be responsible for some days of discomfort to the patient.

I am much indebted to Dr. A. Joe, formerly medical superintendent of the North-Western Hospital, L.C.C., for allowing me access to the case records while I was a member of his staff and for permission to publish this analysis, which is compiled mainly from his personal observations. Also to Dr. J. A. H. Brincker, chief medical officer, L.C.C., and Dr. R. G. White, of the Belmont Laboratories, for their kindly criticism of this paper.

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PREPARATION 2020

A NEW BLOOD-PRESSURE RAISING DRUG*

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With observations on its use in Asthma

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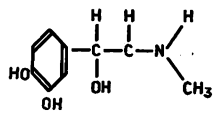
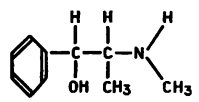
AN important phase in modern therapeutics has been the introduction of drugs chemically related to adrenaline and acetylcholine, and there are already many variations on these two themes. A striking feature of these new drugs is the way in which they reproduce mainly one action of their parent substance. Carbaminoylcholine (Doryl) acts powerfully on the bladder and is used for the treatment of post-operative retention of urine. Acetyl β-methylcholine (Mecholin) with its chief action on the heart, finds its application in paroxysmal tachycardia. Benzedrine, too, with its remarkable cerebral effects, is another example of this new group.

The preparation 2020 (Ciba Ltd.), a sympathomimetic drug, is a distant relation of adrenaline. Its chemical name is trimethoxybenzyl-dihydroimidoazol hydrochloride (Fig. 1). In laboratory animals it was found to produce prolonged elevation of the blood pressure. In man it appears to act predominantly on the smooth muscle of the blood-vessels and skin, producing a rise in blood pressure, pallor, and goose-skin.

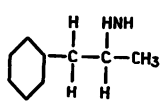
FIG. 1



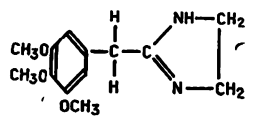
Adrenaline.



Ephedrine.



Benzedrine.



Preparation 2020.

Clinical trial has demonstrated its pressor effect. After injection there is a sharp rise in the blood pressure, and then a gradual fall to the original level. There is also slowing of the pulse, which may outlast the corresponding rise in blood pressure. With 0·1 gramme intravenously (Fig. 2) there is a rise of 30–80 mm. Hg, the total effect lasting about thirty minutes. There is considerable variation in the degree of response of individuals, and even on different occasions with the same patient. This is, however, a feature of drugs which reproduce the action of the autonomic nervous sytem. Inconstant response has been obtained with the same dose intramuscularly, but with doses of 0·2 and 0·3 g. there is a greater and more prolonged effect (Fig. 3). The preparation is also active when given by mouth.

The slowing of the pulse is prevented or abolished by atropine, without loss of the pressor effect (Fig. 4). Electrocardiograms taken after intravenous injection in six patients show that the slowing was a sinus bradycardia. That it is possible to

* A report to the Therapeutic Trials Committee of the Medical Research Council.

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produce heart-block, however, was demonstrated in one patient with rheumatic carditis. Her electrocardiogram showed prolongation of the P–R interval with dropped beats. It should be mentioned that a pulse-rate between 40 and 50 may be found soon after the injection. So far there has been no cause for anxiety on this account, but in view of the heart-block on the one occasion, we would suggest an intravenous injection of atropine 1/75 grain should there be undue slowing of the pulse. This, it is emphasised, does not abolish the pressor effect; indeed, it appears slightly to increase it.

Immediately after injection the patient complains of coldness down the back of the neck and spine, which quickly spreads over the trunk and limbs. There is a sensation of tightness across the forehead and on the vertex. These sensations appear to be the result of the contraction of the smooth muscle in the skin; gooseskin is nearly always seen. This is probably largely due to direct action on the erector pilæ muscles, for it is seen locally around a small subcutaneous injection. Usually the skin appears pale, but a transient patchy erythema was seen round the neck and trunk in a few patients. When the drug is given by mouth or by intramuscular injection the reactions are uncomfortable but seldom really unpleasant. When it is given intravenously, however, there may be unpleasant palpitations and throbbing of the head. Respirations may be increased for a short time. Some patients experience a desire to micturate, but are unable to do so. No cerebral effects have been observed in any of our patients. In four cases the blood-sugar was estimated and showed no increase, as after injection of adrenaline. Gastric peristalsis was seen to be inhibited for 15–20 minutes, when the drug was injected into patients having barium X ray examinations.

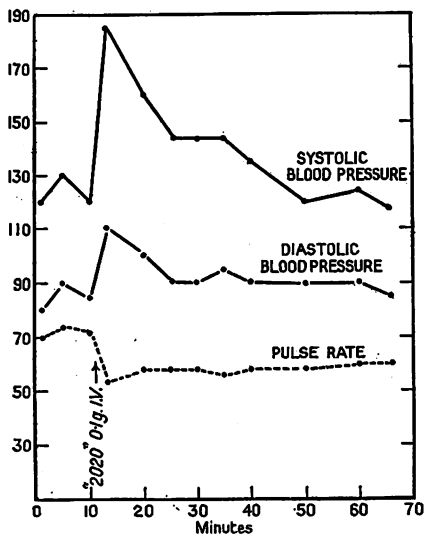

FIG. 2.—Effect of intravenous injection of 2020 (0·1 g.). (Man, aged 40, with gastric ulcer.)

Cautious and extensive clinical trial has established the safety of this drug in the prescribed doses. In 1 patient only, out of a total of about 150, were toxic effects observed, an urticarial eruption developing about half an hour after the injection.

The maximum dosage used so far has been: intravenously 0·2 gramme; intramuscularly 0·3 g.; by mouth 1·0 g. The recommended dose is intravenously 0·1 g., intramuscularly 0·2 g.

CLINICAL APPLICATION

Spinal anæsthesia.—It is well known that the blood pressure may fall considerably during spinal anæsthesia, even after the customary injection of 0·1 g. of ephedrine intramuscularly. Such cases may cause much anxiety, as the blood pressure usually fails to respond to further injections of ephedrine. Preparation 2020, 0·1 g. intravenously, will cause a sharp rise of the blood pressure and a slowing of the pulse-rate. This has been demonstrated in 9 cases, 2 of which are illustrated in Figs. 5 and 6. The first patient was a woman aged 50, who was having a cholecystectomy and the injection was given because the systolic blood pressure had fallen to 90 mm. Hg and showed no signs of rising. The immediate response of the blood pressure and improvement in the pulse relieved the anæsthetist of his anxiety. The readings in Fig. 6 are from a woman aged 40 with Raynaud's disease who was having skin-temperature tests after spinal anæsthesia. A comparison between ephedrine and 2020 is possible in this case.

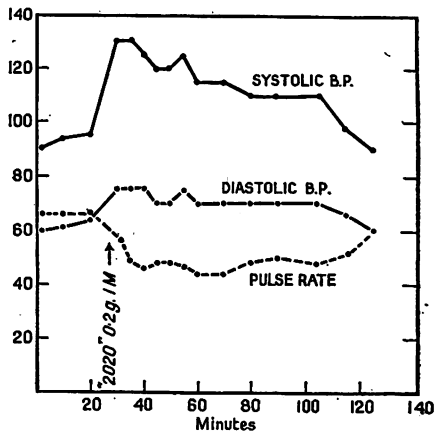

FIG. 3.—Intramuscular injection of 2020 (0·2 g.) showing more prolonged effect. (Man with duodenal ulcer.)

At present, the best dose to give simultaneously with spinal anæsthesia is still uncertain. In earlier cases, which received 0·15 g. intramuscularly, the blood pressure was not satisfactorily controlled. With 0·2 g. the results have been much better, but it is possible that larger doses may be necessary. Mr. Frankis Evans has kindly used this preparation in 25 cases of spinal anæsthesia. The results in larger series will be reported in due course, but this preparation appears to be superior to ephedrine when given after the blood pressure has fallen. While not conclusive, our recent graphs suggest that its action may also be more satisfactory than that of ephedrine when given at the time of the anæsthetic.

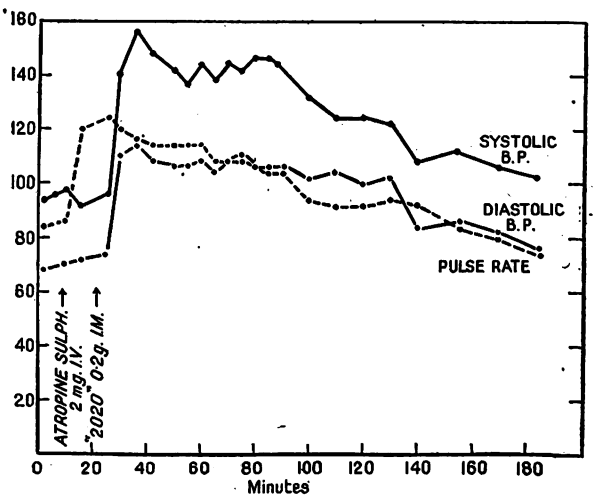

FIG. 4.—Effect of intravenous injection of atropine (2 mg.) before intramuscular injection of 2020 (0·2 g.). (Woman with duodenal ulcer.)

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Treatment of shock.—Operative shock is a dreaded complication of surgical intervention. Preparation 2020 has been used with admirable results in 5 cases, 3 of which, however, received Coramine at the same time.

CASE 1.—A man of 60, with a perforated gastric ulcer, became almost pulseless and moribund. He responded immediately to an injection of 0·1 g. of 2020 only, intravenously. His blood pressure rose to 130 and the pulse-rate fell to 60 and became full and bounding. The operation was completed.

CASE 2.—A man aged 75, during a colostomy performed under spinal anæsthesia for intestinal obstruction due to carcinoma of the colon, became pale and collapsed, twenty minutes after the beginning of the operation. 0·1 g. of 2020 was given intramuscularly and eight minutes later his blood pressure had risen from 115/40 to 170/60 and his pulse-rate had fallen from 116 to 108. The operation was completed satisfactorily.

CASE 3.—A man of 65, with an appendix abscess and general peritonitis, collapsed during operation under spinal anæsthesia. 8 c.cm. of coramine and 0·2 g. of 2020 were injected intravenously. The patient responded dramatically; his pulse became firm and slow and the operation was completed without further anxiety.

Four other cases of operative shock which were given 0·05 or 0·1 g. intramuscularly showed little

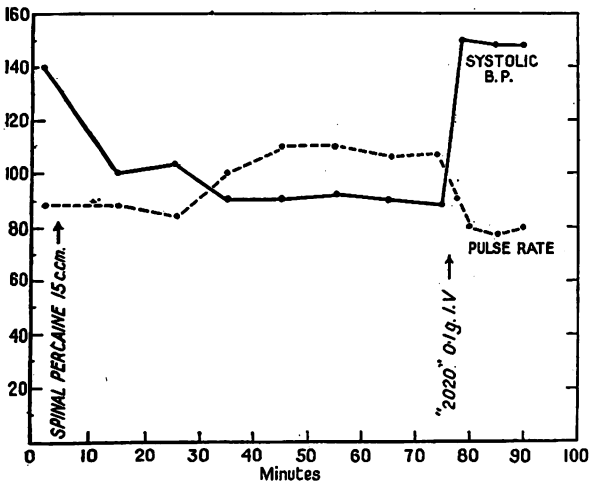

FIG. 5.—Effect of 2020 (0·1 g. intravenously) during spinal anæsthesia (see text).

or no response. It appears to be of most value given intravenously. If necessary the injection could be repeated.

This preparation was also used in one case of collapse after post-partum hæmorrhage and manual removal of the placenta; ·0·05 g. was injected intravenously, but was without effect.

Treatment of bronchial asthma.—2020 was administered by one of us (C. W.) to 16 patients, 6 of whom were in-patients. It is obviously more satisfactory to make direct observations on patients in hospital, but almost always the severity of the attacks appeared to diminish spontaneously after admission to hospital. It was decided, therefore, to administer 2020 by mouth to patients attending the out-patient clinic and to compare the subjective improvement produced by the drug with that produced by ephedrine over a given period of time. The following abstract illustrates the results of this procedure in a typical case.

A. B., a woman of 24, had a fifteen years' history of asthma. During the last six months the attacks had increased in

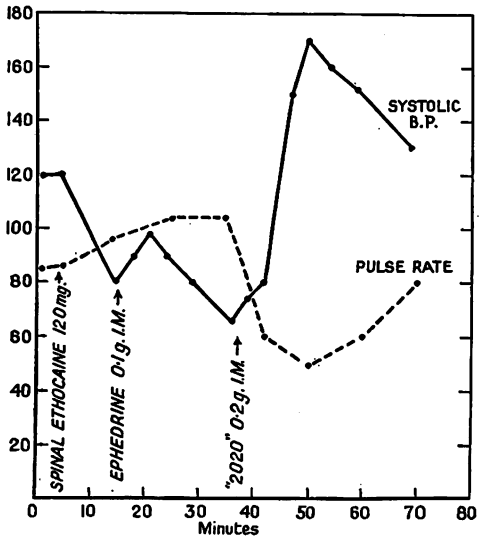

FIG. 6.—Effect of 2020 (0·2 g. intramuscularly) during spinal anæsthesia (see text).

frequency and severity, occurring practically every night and occasionally during the day. They lasted between one and twelve hours. Apart from signs of emphysema physical examination was negative. Radiography of the chest and sputum examination were also negative.

Ephedrine ½ grain twice daily by mouth was administered with good relief of symptoms. The attacks diminished in frequency to once or twice weekly and were less severe, lasting not more than two or three hours. After several weeks' treatment, however, ephedrine became less effective and after six weeks the attacks recurred nightly, and ephedrine was without effect. 2020 in 0·1 g. doses was now given twice daily and the attacks diminished in frequency and intensity, severe attacks occurring only about once a week. One 0·1 g. tablet of the drug, at the onset of an attack, would always prevent its development, but was useless once the attack was fully developed. The only untoward effect observed was the occurrence of goose-flesh about an hour after taking the drug and this might persist half to two hours. This patient continued to obtain relief from 2020 for thirteen weeks, after which she contracted a cold in the head and severe attacks of asthma recurred nightly for ten days. During this time she obtained relief from neither ephedrine nor 2020. The condition improved spontaneously and subsequently she obtained relief from ephedrine in half-grain doses, whilst 2020 (0·1 g.) appeared to be valueless.

Of the 16 cases of bronchial asthma treated with 2020, 10 were in some measure relieved. Of these 10, 1 did not respond to ephedrine and in 1 ephedrine, though effective at first, subsequently failed to relieve the attacks. A third patient could not tolerate ephedrine on account of palpitations, but responded to 2020 without any severe symptoms being produced. In one case after thirteen weeks, and in a second after three weeks' administration, a tolerance to 2020 was developed. Almost all patients complained of cold shivers or goose-flesh shortly after taking 2020 by mouth, the duration of this symptom being from half to three hours. Two patients complained of fullness of the head and dizziness and because of these symptoms preferred ephedrine to 2020. No other untoward reactions were observed after oral administration of the drug, the maximum period of administration being sixteen weeks.

In a smaller series of 8 cases (F. A. J.) where asthmatic attacks were controlled by ephedrine, 2020, although giving slight symptomatic relief, was stated by the patients to be inferior to ephedrine.

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Intravenous injections of 0·1 g. were given to two patients during acute attacks, without benefit, although adrenaline was successful.

In renal colic 2020 was tried in 10 cases in view of its action on smooth muscle, but the relief has been too inconstant for its use to be recommended. No action would be expected from a sympathomimetic drug.

In paroxysmal tachycardia it was unsuccessful in one patient, who was given an intravenous injection of 0·1 g. during an attack.

In neurocirculatory asthenia the pulse-rate was maintained, in one case at a slightly lower rate, with 2020, 0·2 g. two-hourly by mouth, with the patient at rest in bed, but the continuous sensation of coldness of the skin made its use unpleasant for the patient. There was no clinical benefit.

In peptic ulcer and colon spasm 2020 does not relieve pain.

SUMMARY

Preparation 2020, a new sympathomimetic drug, raises the blood pressure and slows the pulse.

In therapeutic doses it has little action on the smooth muscle of the alimentary or urogenital tracts.

Its action on the bronchial musculature renders it of some value in asthma, but it appears to be inferior to ephedrine. It may be useful as an alternative drug when ephedrine is contra-indicated or inactive.

It has been found helpful in controlling the blood pressure during spinal anæsthesia and in the treatment of operative shock.

Thanks are due to Prof. L. J. Witts and Prof. Arthur Ellis for help and advice, to Mr. Frankis Evans for his kind coöperation, and to Dr. F. H. Yates and Dr. A. N. Duggal for help in the preliminary investigations.

NATURE OF THE SUBCUTANEOUS SPHERULES IN SOME CASES OF THE EHLERS-DANLOS SYNDROME

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In a recent paper on the Ehlers-Danlos syndrome one of us described the condition as representing an "idiopathic" abnormality of development, manifested by certain main constituent features or signs, not all of which need be present in the same case (Weber 1936). In incomplete forms of the syndrome only one or two of the main signs need be present, for instance, only the friability of the skin and its blood-vessels. The signs are as follows:—

(1) Looseness or over-elasticity of the skin—cutis laxa or cutis hyperelastica. This may be limited to certain portions of the skin, for instance, especially over the convexity of the knees and elbows.

(2) Looseness or over-extensibility of joints, especially the joints of the thumbs and fingers.

(3) Friability of the skin and its blood-vessels. In most cases this is the chief and most obvious sign, as Ronchese (1936) has pointed out. A slight knock, especially where the skin lies directly over bone, may produce a hæmatoma or actual splitting of the skin. Such wounds tend to gape and give rise to characteristic broad "cigarette paper" or "papyraceous" atrophic scars, the presence of many of which, especially over the knees and elbows, is almost pathognomonic. It should not be confused with the scars of the dystrophic type of epidermolysis bullosa, in which sanguineous bullæ occur, but not the hæmatomata and contusional gaping wounds characteristic of the Ehlers-Danlos syndrome.

(4) In the above-described atrophic scars "pseudo-tumours" of loose connective tissue occasionally develop, which have been said to constitute a fourth clinical manifestation of the Ehlers-Danlos syndrome.

(5) In several cases, notably in some observed in England, the presence of peculiar freely movable nodules in the subcutaneous tissue of certain regions has been observed. These nodules or "spherules" are usually pea-sized or smaller, and slip about under the skin, apparently in the superficial portion of the subcutaneous fat. By light pressure with the finger they can easily be moved an inch or considerably more without any pain or tenderness being complained of. Owing to their hardness one would not expect them to be lipomata, but by microscopic examination they have been found to consist of fat, and Tobias (1934) referred to them as multiple subcutaneous lipomata. We think (see further on) that they are sprouting (bud-like) lobules of subcutaneous fat, which by gradual thinning and atrophy of their pedicles become more or less free bodies in the loose subcutaneous tissue. They apparently were present in four out of the seven English cases of the Ehlers-Danlos syndrome referred to by Parkes Weber (1936), though the microscopical reports were not all in accordance with our view. Their presence in considerable number may be said to constitute the most remarkable feature of the present case.

PRESENT CASE

The patient is a married woman, now aged 34, 1·65 metres in height and 73 kg. (11½ st.) in weight. She has enjoyed fair health, except for various aches and pains, especially in the feet, and some attacks of biliary colic, the first attack having been during her first pregnancy. Since the birth of her last child (fourth pregnancy), five years ago, she has tended to increase in weight, but under recent temporary dietetic restrictions she became somewhat thinner.

There can be no doubt that she is an example of the Ehlers-Danlos syndrome. The cutis laxa is fairly well marked over the elbows, knees, and back of the hands. In some other parts, notably in the loins, a considerable development of subcutaneous fat has given rise to waterbed-like "cushions," which were more striking some months ago when she was fatter. Over-extensibility of joints is shown mainly in the fingers, particularly at the proximal interphalangeal joints. The friability of the skin and its blood-vessels is less marked than in most typical cases, but there are a few characteristic "atrophic" scars over the elbows (dating from childhood) and she "bruises easily." The application of the capillary resistance (Rumpel-Leede) test leads to a slight cutaneous ecchymosis. The "atrophic" scars over the elbows have not been associated with the formation of connective tissue "pseudo-tumours," as in some cases.

The most remarkable feature of the case is, however, as already mentioned, the presence of a considerable number of freely movable subcutaneous spherules, which can be easily shifted for an inch or considerably more in any direction under the skin. They are mostly less than pea-sized and feel hard and are not associated with any pain or tenderness. Most of them are on the forearms and back of the hands, but some minute ones (strikingly hard to the touch) are located about the right patella. A biopsy on one of them from the back of the left hand showed it to consist of ordinary fat vesicles enclosed in a fibrous capsule. Macroscopically, when excised, it seemed a little less translucent than the surrounding fat, from which it was almost entirely disconnected.

Other data.—Nothing special by ordinary examination of the heart, lungs, liver, and spleen. The urine contained a slight "cloud" of albumin and a few leucocytes. Brachial

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blood pressure: 110/85 mm. Hg. Blood count: hæmoglobin, 102 per cent.; erythrocytes, 5,300,000; leucocytes, 7200 (eosinophils 3 per cent., polymorphonuclear leucocytes 42 per cent., lymphocytes 46 per cent., monocytes 9 per cent). Thrombocytes: 260,000 per c.mm. of blood. Nothing abnormal was found in regard to the blood coagulation time, the erythrocyte-sedimentation rate, the blood calcium, the blood-sugar curve, and the radiogram of the pituitary fossa.

REMARKS IN CONCLUSION

It seems that the presence of freely movable subcutaneous spherules, in considerable numbers, especially in regions where the skin is loose (cutis laxa), may be included as a fifth main sign of the Ehlers-Danlos syndrome, though it has not been recorded in most cases. Further observations are necessary to show in what proportion of cases this sign is present. The spherules are apparently not true lipomata, but result from a deviation in the normal type of fat growth—namely, from the arborescent (bud-like) development of small lobules from the subcutaneous fat. These lobules, after almost losing their pedicles and blood-supply and with thickening of their capsules, constitute hard spherules freely movable in the subcutaneous tissue. Probably in time they become minute oil-containing cysts, with thickened fibrous or even calcareous walls.

In the present case these subcutaneous spherules form the most remarkable feature, and there are only a few of the "atrophic" scars which usually constitute the most important character of the Ehlers-Danlos syndrome. The spherules probably also occasionally occur in cases which are not obviously examples of the Ehlers-Danlos syndrome.

The Ehlers-Danlos syndrome is probably not so rare as is supposed. Since Parkes Weber's paper in December, 1936, cases from three families have been demonstrated before the dermatological section of the Royal Society of Medicine in London, and cases have been heard of from elsewhere in England.

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FATAL INFECTIONS BY HÆMOLYTIC STREPTOCOCCUS GROUP B

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Lancefield (1933) described a serological method for differentiating the hæmolytic streptococci into a number of groups. Two years later Lancefield and Hare (1935) added to these groups and showed that practically all *severe* human hæmolytic streptococcal infections, in the puerperium at least, are caused by streptococci belonging to Group A. They found in their series 18 *mild* infections due to streptococci of groups other than A, and of these 7 were Group B.

This finding, of the paramount importance of Group A hæmolytic streptococci in human infections, has now been confirmed on a much larger number of patients at Queen Charlotte's Hospital Isolation Block, but a few exceptions to the general rule have appeared. Of these exceptions, the infections by Group B streptococci appear to be the most important. Between January, 1936, and October, 1937, seven patients have been admitted with Group B infections; of these one died. Two other patients died in 1934 who were infected by hæmolytic streptococci which were known to be atypical, though at that time we were not doing serological grouping as a routine. These streptococci were fortunately preserved, and have since been found to be members of Group B.

There are thus three fatal cases of Group B infection in the records of Queen Charlotte's Isolation Block, and the clinical history and anatomical findings are of some interest, if only to support the belief that the division of the hæmolytic streptococci into groups represents a true difference between the streptococci, and that the members of different groups give rise to different pathological conditions in the body.

SUMMARY OF CASES*

Case 1

Primipara, aged 29; 36 weeks' twin delivery, the first by forceps; placenta and membranes expelled intact. Onset of fever on 3rd day. Admitted to the isolation block on 6th day.

On admission: temperature 99·2° F., pulse-rate 110. Abdomen moved well, and was soft and flaccid. Small vaginal laceration and several small cervical tears. Foul-smelling clot in uterus. Culture from vaginal swab showed heavy growth of hæmolytic streptococcus, Group B. Some pain in left shoulder. On the 13th day the temperature, which had been low, rose to 102·4° F., and the patient complained of pain on breathing in right side of chest. No rise in respiration-rate. By the 25th day she felt much better, with very little pain, but by the 30th day she again had pain in right side of chest, with some dyspnœa. The temperature, pulse- and respiration-rate were all high. The chest was aspirated on the evening of the 30th day, and a small quantity of foul-smelling pus was drawn off. On the following day 12 oz. of pus was drawn off, and on the 33rd day 46 oz. She died on the morning of the 34th day.

Cultures of the pus from the chest showed hæmolytic streptococcus Group B. Blood cultures were consistently sterile.

Post-mortem examination eight hours after death showed 10 oz. of thick yellow pus in the right pleural cavity. The right lung was collapsed, and both visceral and parietal pleura were covered with a thick shaggy layer of fibrin. The lung was firmly adherent to the diaphragm and pericardium. On the left side there was a little early pleurisy at the base. The left lung was slightly œdematous but otherwise normal. The pericardium contained a few ounces of slightly turbid fluid and a few flakes of fibrin. The heart was not enlarged and appeared normal. In the abdomen there was a large collection of pus, similar to that in the pleura, in the lesser sac and between the layers of the left triangular ligament of the liver. The liver on section showed an unusual picture of multiple abscesses. The two largest of these, in the upper part of the right lobe, measured 6 by 3 cm. and 4 by 2·5 cm., the smaller of these being filled with thick yellow pus and the larger containing brown granular debris. Round these were a number of smaller abscesses, and spreading to the left was a chain of similar abscesses, near the upper surface of the liver, varying from 2 mm. to 2 cm. in diameter. Microscopically these smaller abscesses showed a mass of debris, degenerate polymorphonuclear leucocytes and many clumps of streptococci. In the immediate neighbourhood of the abscesses the liver showed a good deal of destruction of the cells and replacement by collagen. In the portal canals Glisson's capsule was thickened and infiltrated by polymorphonuclears, and there was patchy fatty degeneration throughout the liver. The spleen showed a small infarct near the upper pole, apparently old, showing no sign of recent infection. The uterus was small and well involuted, and showed no signs of sepsis, macroscopically or microscopically. The only other abnormality was in the inferior vena cava, which contained a small piece of ante-mortem clot adherent to the posterior

* In the summary, any days mentioned by number refer to days *after delivery*, unless otherwise stated.

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wall at the bifurcation. This clot was partly organised, and showed no evidence of recent sepsis.

CASE 2

Primipara, aged 28; 40 weeks' normal vertex delivery. Onset of fever on 9th day. Admitted to isolation block on 17th day.

On admission: temperature 101° F., pulse-rate 120. Abdomen soft and moved well. Uterus bulky, slightly retroverted. Some œdema of ankles. Liver enlarged and tender. Short presystolic murmur in heart. Blood culture showed hæmolytic streptococcus Group B, 1 per c.cm. The day after admission she became comatose. Pupils unequal and fixed. Knee-jerks present. Lumbar puncture showed cerebro-spinal fluid under slight tension, but clear; culture was sterile. The coma persisted until the time of death. By the 25th day there was commencing gangrene of the left foot, and on the 26th day the right foot was involved. She died on the evening of that day.

Cultures.—Blood culture on the 18th day showed hæmolytic streptococcus, Group B, 1 in 3 c.cm., on the 19th day 6 per c.cm., and on the 21st day 366 per c.cm. Further cultures from cerebro-spinal fluid were all sterile. Those from the vagina and cervix showed no hæmolytic streptococci at any time, anaerobic streptococci, diphtheroid bacilli, and *Staphylococcus albus* only being found.

Post-mortem examination, 17 hours after death, showed acute infective endocarditis, involving the mitral and aortic valves. On the mitral valve there was a mass of rough, friable vegetations covering the greater part of both cusps. On the aortic valve were two small vegetations, each about 1 mm. in diameter. There was no spreading of the vegetations on to the cordæ tendineæ or the auricular or ventricular walls. In addition to the commencing gangrene of both feet, noted during life, there was septic infarction of the spleen and both kidneys, and of the brain. This last took the form of a number of small areas of softening in the cerebral cortex, on the surface of the island of Reil on each side, and in the lenticular nucleus on each side. Scrapings from these areas showed many polymorphonuclear leucocytes and streptococci, and cultures showed hæmolytic streptococci similar to those found in the blood cultures. The meninges were normal. The uterus was well involuted, and showed no macroscopic or microscopic evidence of recent sepsis.

CASE 3

Woman, aged 46; 4-para.; 40 weeks' uncomplicated breech delivery. History of chorea at the age of 9. Onset of fever on the 4th day and treatment with Prontosil. No details are available as to amount of fever before admission, quantity of prontosil given, or whether red prontosil or sulphanilamide.

On admission to the isolation block on 18th day: Abdomen soft and not tender. Temperature, 99° F., pulse 96. Uterus subinvoluted. No evidence of any extra-genital spread of infection. Examination of heart showed presystolic murmur and occasional extrasystoles. The same evening the temperature and pulse-rate rose to 103·4° F. and 130. These both remained high till the 20th day, when sulphanilamide was given for 24 hours and the temperature fell to normal, the pulse-rate remaining above 100. The temperature rose again on the 23rd and 24th days, but again became lower under the influence of sulphanilamide and then remained normal till death, the pulse-rate always keeping high. The Wassermann reaction was negative. On the 26th day the apex-beat was ½ in. outside the nipple line. There was then some breathlessness, and the respiration-rate rose for the first time. On the 27th day the mental condition became poor, and in the evening hemiplegia developed. She died in the evening of the 28th day.

Cultures from the vagina on admission (18th day) showed *Staphylococcus albus* and diphtheroid bacilli only. The urine was sterile. Blood culture on the 20th day showed hæmolytic streptococcus Group B, 240 per c.cm. The following day Group B streptococci were found in the vaginal swab. Blood culture on the 24th day showed 1200 Group B streptococci per c.cm.

Post-mortem examination, 18 hours after death, showed dilatation of the right side of the heart. The left auricle was dilated and hypertrophied, and the left ventricle was normal in size. The mitral valve showed old thickening of both cusps, with almost complete rigidity of the edges, and shortening of the cordæ. On the anterior cusp was a large, cauliflower-like, friable mass, covering most of the surface of the cusp and extending down the cordæ to the ventricular wall. The other valves were normal. The pericardium showed no recent infection, but there was a small patch of old adhesions over the anterior surface of the right ventricle. The lungs and liver showed passive congestion, and there were septic infarcts in the spleen and right kidney. The uterus contained a number of fibroids, but was otherwise a normal involuting uterus, showing no signs of recent sepsis. In the head the meninges were normal. The only lesion found in the brain was one small area of softening just under the surface of the island of Reil on the right side. Sections through this show a few small thrombosed vessels and scattered patches of polymorphonuclear infiltration with karyolysis in the brain cells.

DISCUSSION

It is difficult to estimate accurately the incidence of infections by hæmolytic streptococcus Group B, as the material available is necessarily scanty. From January, 1936, to November, 1937, out of 211 patients infected by hæmolytic streptococcus (all groups), only 7 (3·3 per cent.) have been Group B infections, of whom only one has died. It is not known how many non-fatal cases there may have been in previous years, since grouping was not used as a routine method before 1936, but it is possible to state with some certainty that there were no fatal cases other than the two in 1934 described above, since streptococci from fatal cases have always been kept and studied with particular care.

Of the three patients described above, Case 1 is quite unlike any other case of puerperal sepsis that I have seen in the past six years. The striking features in this case were the subphrenic and multiple liver abscesses, and the pleural effusion with thick layers of fibrin firmly adherent to the pleural surfaces. Such a picture forms a marked contrast to the Group A infections, in which a characteristic feature is the absence of localised abscess formation, and in which fibrin is deposited on the serous surfaces generally in the form of thin smooth plaques, easily peeled off leaving a smooth surface. These features are possibly connected with the production of fibrinolysin by the Group A streptococci (Tillett and Garner 1933). Of the uterus little can be said, since there were no signs of sepsis by the 34th day, but as Group B streptococci were found in the vaginal swab on admission on the 6th day the infection presumably started in the genital tract.

Cases 2 and 3, which were so alike in their clinical course and morbid anatomy, are in an entirely different class from Case 1. In these two the prominent feature was the valvular lesions in the heart. In neither is there any evidence of a genital tract infection with Group B streptococci on admission, and one of them never showed these organisms in the vaginal swab up to the day of death. Both patients, however, showed positive blood cultures on admission. In neither was there any post-mortem evidence of uterine sepsis, but this may have little significance three to four weeks after delivery, judging by the appearances seen in some other of the less acute infections, notably those caused by anaerobic streptococci. In view of the positive blood cultures with the absence of Group B streptococci from the vagina it seems likely that Cases 2 and 3 were not primarily genital tract infections.

A comparison between these two cases of endocarditis and endocarditis due to Group A hæmolytic

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streptococci would be interesting, but is difficult on account of the scarcity of known Group A cases. In the Queen Charlotte's series there is only one with endocarditis due to a known Group A hæmolytic streptococcus. In this patient the valvular lesion consisted of a small flat elliptical plaque on the posterior cusp of the mitral valve, measuring 5 × 3 mm., only slightly raised above the surface of the valve, roughened and pale orange in colour, with a slightly raised edge. This is in sharp contrast to the large masses of friable vegetations seen in the two patients reported above. This difference does not seem to be due merely to a difference in the acuteness of the infection, as the Group A patient died on the 20th day after the onset of fever, while the duration of fever in the two Group B patients was 15 days and 24 days. A further interesting difference is shown in the frequency of endocarditis in these infections. In the last two years about 90 per cent. of all hæmolytic streptococcus infections in the Isolation Block have been due to Group A, and only 3·3 per cent. to Group B. We may safely assume that roughly similar figures would have been found in previous years if the streptococci had been grouped. In spite of this, we have only one recorded case of Group A endocarditis in the last six years, and two due to Group B streptococci. It is clearly impossible to generalise on three cases, but the differences are so striking that I should welcome further information, and particularly cultures of hæmolytic streptococci for grouping from any cases of endocarditis if there is any chance of subsequent access to post-mortem material.

There is little information available as to the source of infection in these three patients. In Case 1 the throat and nose of the patient herself and those of the doctor and nurses in attendance at the delivery were all negative for hæmolytic streptococcus. The infection may well have originated from organisms already in the vagina, for it is known that hæmolytic streptococcus Group B is occasionally present in the vagina before delivery (Hare and Colebrook 1934, Lancefield and Hare 1935). In Cases 2 and 3 the possibility of a genital origin is ruled out by the negative vaginal cultures on admission and later, while the blood cultures were already positive. The throats in these two patients were not examined, and they may have been the source of the infection, for Hare (1935) isolated hæmolytic streptococcus Group B occasionally from tonsillar swabs. The other possible source is cow's milk, since Group B streptococci are commonly associated with bovine mastitis, and it is conceivable that the infections in Cases 2 and 3 were both milk-borne infections originating or lit up soon after delivery.

SUMMARY

Three fatal cases of infection in the puerperium by hæmolytic streptococcus Group B are described, and some points of difference noted between these and infections by hæmolytic streptococcus Group A.

An appeal is made for more information about hæmolytic streptococcal endocarditis, and especially for cultures from such cases.

My thanks are due to the staff of Queen Charlotte's Hospital for allowing me to make use of the clinical records of these three cases.

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INCIDENCE OF WEIL'S DISEASE AMONG COAL-MINERS IN NORTHUMBERLAND AND DURHAM

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IN 1935 we described 12 cases of Weil's disease among miners in the north-eastern coal-field (Swan and McKeon 1935). From that time until the end of 1936 we had seen 17 more cases of the disease, 14 of which were in coal-miners. Of the other 3 patients 1 was a gardener and 2 contracted the disease after immersion, one in the River Tyne and the other, a sailor, in a canal in France. Of these 17 new cases the diagnosis was confirmed by serological agglutination in all but 1. Of the total of 29 cases 9 (31 per cent.) were fatal.

Previous investigations into incidence.—Alston and Brown (1935) were the first in this country to examine the sera of healthy persons whose occupation exposed them to the risk of Weil's disease. Among 45 London sewer-workers who had no recollection of ever having had jaundice they found 9 men (20 per cent.) whose serum contained antibodies to *Leptospira icterohæmorrhagiæ* in titres of between 1/30 and 1/100. Smith and Davidson (1936) examined the serum from 210 fish-workers in Aberdeen and found immune bodies in 51 (24 per cent.), but in this group 9 persons were known to have had Weil's disease in the past. As a control they examined 403 sera sent for Wassermann and Widal reactions and these were all negative.

Present series.—In an effort to estimate the incidence of subclinical infection with *L. icterohæmorrhagiæ* among coal-miners in our area we visited two collieries in the autumn of 1936. In one of these (Colliery E) 6 cases of Weil's disease occurred between February, 1935, and December, 1936, the last being after our visit. In the other colliery (Colliery F) 3 cases had occurred in May and June, 1936. We had seen personally all these 9 cases and in all the diagnosis had been confirmed by serological agglutination. Among the miners at these collieries 101 volunteered to give blood for examination and Major H. C. Brown of the Wellcome Bureau of Scientific Research very kindly consented to examine the sera.

From Colliery E 81 sera were obtained. In this colliery one seam was particularly suspect, 5 cases having arisen in men working in it; the seam was wet and infested with rats. Colliery F provided the remaining 20 sera. It had always been a dry pit until some old workings containing water were opened into. A short time after this event the 3 cases developed, all in men working in the same seam.

Results.—Of the total of 101 men all gave negative agglutination results except 2 from Colliery E. These 2 men gave histories of a serious illness with jaundice eighteen months previously which seemed to be clinically identical with Weil's disease. Both their sera agglutinated to a titre of 1/300. The remaining 99 men for the most part gave no history of any previous illness whatever, and none gave a history of anything in the least resembling Weil's disease. All their sera showed a negative agglutination at a titre of 1/30. None of the men had worked as miners

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for less than a year, the longest period at work being 46 years. The average mining life of the men was 23¼ years.

All the men had worked in the suspected areas at one time or another; in Colliery E 29 men, and in Colliery F 13 men were actually working in the suspected areas when cases of the disease were occurring.

SUMMARY AND CONCLUSIONS

The blood of 101 coal-miners exposed to the risk of infection with *L. icterohæmorrhagiæ* was examined for the presence of immune bodies. In only 2 cases were they present and both of these had presumably had severe Weil's disease in the past. These results are at variance with those previously published relating to sewer-workers and fish-workers. There seems to be no adequate explanation for this and we can only conclude that the incidence of subclinical Weil's disease among coal-miners in the North East of England is less than might have been anticipated.

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MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF MEDICINE

AT a meeting of this section held on Jan. 13th, with Prof. H. LETHEBY TIDY, the president, in the chair, a discussion on certain aspects of

The Asthma Problem

was opened by Dr. FRANCIS M. RACKEMANN (Boston). Asthma, he said, was obviously a symptom and usually depended upon allergy. It was very common, for 2 or 3 per cent. of the population had either asthma or hay-fever; and it was interesting as depending more upon the reaction of the host than upon the nature of the exciting agent. To understand the reason for asthma and its nature would be a great step towards understanding immunity in general.

Asthma, hay-fever, and eczema depended upon reactions of an immediate urticarial type, readily demonstrable by a skin test. Some authorities believed that eczema was caused by a reaction in the superficial and urticaria by one in the deeper layers of the skin. These reactions occurred in normal as well as in allergic subjects, and could be reproduced in animals. A large dose of horse serum would produce a positive skin test in most normal persons. Patients recovering from pneumonia or infested by a parasite would often give a positive skin test to the specific pneumococcal carbohydrate or to an extract of the parasite. Delayed reactions also took place up to 48 hours after the exposure; a classical example was the reaction to tuberculin. The delayed and the immediate reaction could be correlated to show that each played its part in the development of normal immunity. Dr. Rackemann quoted illustrative cases of patients sensitive to lobster, wheat, and ragweed. Sensitiveness, he said, was exquisite, often multiple, and hereditary. The symptoms associated with asthma were characteristic: low blood pressure, rapid pulse, quickness to tire, and an illness during the attack which suggested some hostile agent apart from the asthma itself. Many persons would give a positive skin test who never had an attack. The process seemed to be different, but he did not know whether it were really so or merely a variation of the same phenomenon.

The manner of production of the symptoms was a fundamental problem. He doubted whether the lesion in asthma was an extension down the throat of the hay-fever reaction. He never saw laryngitis in either type of condition. Some patients with food allergy had abdominal symptoms, and in others these symptoms might complicate a condition which depended upon dust. In a few patients migraine was due to food or dust. All these symptoms must depend on local tissue sensitiveness, but the offensive agent was presumably carried in the blood. If the serum of an egg-sensitive patient were injected into a normal person, a reaction would appear at the site when an egg was eaten. The serum of a ragweed-sensitive patient would make a normal person react positively to a skin test with ragweed extract made at another point. White of egg given to dogs appeared unchanged in the blood. Some of the remote symptoms of allergy might be explained by assuming a blood-borne agent.

Few patients died of asthma, but in one who had died in an acute attack through suffocation, macroscopic section showed the lungs studded with plugs of tough, sticky, tenacious mucus. Some workers thought that the mucous glands in the walls of the bronchi were hypertrophied and over-active. This appeared to be the real lesion. Fibrin was deposited, and eosinophils and small round cells multiplied. These obstructions would account for all the symptoms. Dr. Rackemann doubted whether this hypertrophy could be interpreted as an allergic response, and suspected it to be due to a peculiar nerve reflex. He was attracted by the theory that the hostile agent was choline esterase, the ferment which broke down acetylcholine. He declared that if English-speaking workers combined, they might produce noteworthy results.

Prof. L. J. WITTS described asthma as a very discouraging problem. The physician could, he said, establish a modus vivendi with many patients and pretend to benefit them by desensitisation, vaccines, or non-specific therapy. When they were followed up they were too often found to have relapsed, or to be reacting to another kind of agent or in another way. So much of the work done on allergy concerned the trigger and not the gun. None of the asthma remedies could be called a "real winner" in the sense of the recently discovered drugs which controlled abnormalities of muscle and secretion. The most fundamental approach was, he thought, the search for a general bodily disturbance. Psychic factors, though they were not the whole story, caused striking variations, and physical exercises modified the condition. The soil rather than the seed must be studied.

Dr. E. R. BOLAND regarded the difficulty of assessing results of treatment as in itself a criticism of therapeutic efforts. Patients would produce every permutation and combination of improvement short of cure, but he gravely doubted whether objective evidence of real improvement existed, or, if it did, whether it was not a result of chance, lapse of time, or change of season. The history often belied a patient's optimism: he would claim to be better but really be having just as many and as severe attacks. Improvement often went with a change in the actual

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or psychological situation. Normal saline seemed to be as effective as any drug with a specific action or as protein desensitisation. Remedial exercises were a more helpful addition to general treatment than were desensitisation or saline. Vaccine therapy showed no particular promise. He advised closer study of individual attacks and their causation. Better results would, he thought, be obtained from desensitisation if skin tests were more reliable. Progress would be assisted by a common technique and standardised preparations.

The PRESIDENT recalled Osler's observation that the common end of urticaria patients was death from nephritis and uræmia, and said that he had seen patients die apparently from this cause without any evidence of renal disease. A condition might exist in which the brain imitated death from uræmia without any change in the kidney or the blood-urea. During a serum reaction the blood contained heterophil agglutinins—agglutinins and hæmolysins to sheep's red cells. Only one other condition—glandular fever—produced this reaction. He drew no deductions from this striking fact.

Dr. L. S. T. BURRELL related instances in which a medical officer had an attack of asthma cut short by a call to a dying relative, and a relapse on realising its cessation; and an elderly lady had completely recovered from asthma after a bad motor-car accident. A follow-up investigation undertaken at the Brompton Hospital asthma clinic showed that three-quarters of young patients grew out of the disease spontaneously, a fact which somewhat compromised statistics of treatment. Medical men did not know how to treat asthma and worked entirely in the dark.

Dr. W. F. H. COKE declined to be so pessimistic, and claimed value for adrenaline combined with desensitisation, and for the new differential sedimentation tests which would distinguish between patients of the allergic, the microbic, and the aspirin-sensitive types. Bacterial asthma was overshadowed by allergy. The postnasal swab was most important, and even the aspirin-sensitive patient could be cured by suitable vaccines. Shock might produce an effect by liberating large quantities of adrenaline.

Dr. G. W. BRAY maintained that the mode of absorption of allergens was almost always lymphatic. He pointed to the results of investigating a number of cold-sensitive children who developed angio-neurotic œdema on dipping the hand into cold water: a swelling of the glands was noted immediately, and quickly extended to the axilla. Some of them developed an asthmatic attack, which could be prevented by applying a tourniquet to the arm. Other experiments had shown that egg-white given by the stomach could be found in the lymphatic ducts but not in the portal vein. A similar condition of the lymphatic vessels might be present in glandular fever. The mucous glands were hypertrophied in adults only, not in children. If the asthma were due to a spasm of the muscle, it ought to occlude the ducts and prevent the large volumes of fibrinous material from entering the glands during an attack. Hypertrophy with a damming back of the mucus was a mechanical phenomenon rather than a primary cause.

Dr. RACKEMANN, in reply, said that children who outgrew asthma were really cured through disappearance of the underlying mechanism. Treatment was effective when the asthma depended on a specific cause which was discovered. To be of value the history of a case must explain not only why the asthma occurred but why it disappeared; it must account for all the time, and look for reasons of remission. One of the major difficulties in understanding the disease was lack of controls. Residence in hospital might itself be the treatment.

SECTION OF THERAPEUTICS AND PHARMACOLOGY

A MEETING of this section was held on Jan. 11th, Dr. J. W. TREVAN, the president, being in the chair. A discussion on

Nutritional Therapy in Pregnancy

was opened by Dr. R. A. MCCANCE. He described the results of an analysis of the food eaten in pregnancy by 116 women at different economic levels. About 50 were wives of unemployed miners in South Wales and Northumberland, 20 the wives of employed labourers in Bermondsey, London, 21 were of the artisan class living in Camberwell, London, and 22 belonged to the professional classes and lived in various parts of the country. The women had been weighed and measured and in 77 the hæmoglobin had been determined by Haldane's method. The composition of the diets had been calculated from analyses made at King's College Hospital. The food eaten by each woman varied considerably in amount from day to day and it was considered that a week was the shortest time in which a reliable assessment of an individual's diet could be made. The composition of the diets was affected by at least two considerations—personal taste and income. When classified according to the weekly income per head in the household (after deduction of rent) there were 16 women with less than 6*s*., 23 with 6*s*. to 9*s*., 19 with 9*s*. to 15*s*., 14 with 15*s*. to 25*s*., 13 with 25*s*. to 40*s*., and 22 with over 40*s*.

The average intake of calories in the different groups ranged from about 2100 to 2700 a day. The intakes of calcium, phosphorus, and iron increased fairly steadily in passing from the poorest to the richest groups and the differences in mineral intake were attributable largely to the gradual increase in the consumption of the so-called protective foods. Thus the greater proportion of milk taken by the richer groups explained the increase in calcium and the greater amount of brown bread eaten by the highest income group accounted for some of their greater iron intake, but a steady rise in amounts of eggs, green vegetables, raw fruit, meat, and fish was also partly responsible. The consumption of bread declined with rising income. How did these differences affect health? It was found that the women in the poorer classes were on the average shorter than the well-to-do, and the hæmoglobin level also rose in passing from the poorer to the richer groups, the differences between the first and last groups being in both cases statistically significant. A significant correlation had also been found between the hæmoglobin levels of individual women and their iron intakes. It seemed then that those in the poorer classes gave evidence of worse nutrition both at present and in the past. Judged by the standards set out by the technical committee of the League of Nations however the diets of even the richest income group were not entirely adequate. In these women the total calorie value must have been dictated by appetite and not by economic limitations, so that the committee's 3000–3500 calories a day may be in excess of that required by British women. The League's recommendations for calcium, however, were presumably based on careful assessments of

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calcium balance and if their figure of 1·60 g. per diem is correct the diets of all the women in this investigation were deficient in calcium. The same line of argument showed that the women were not eating enough phosphorus. The cost of the League's recommendations for protective foods was estimated to be about 10*s.* 10*d.* a week. The analysis of the well-to-do women's diets showed that many would find it really difficult to carry out the recommendations without radically altering their natural food habits or greatly exceeding their chosen and probably physiological intake of calories. Practical remedies for the deficiencies seemed to lie in teaching women what articles of food to eat, in increasing the purchasing power (for food) of the poor, in communal feeding, and in medicinal supplements. The complete solution possibly called for a mixture of all four methods.

Dr. MARGARET BALFOUR described observations on the effect of adding certain concentrated food substances to the diet of pregnant women in South Wales. She said that a nutritional scheme for assisting expectant mothers in the special areas of England and Wales had been organised by the National Birthday Trust Fund in 1935 and had been gradually extended by aid of a grant from the Commissioner for the special areas until in the year 1937–38 the provision of foods for 12,000 expectant mothers had been estimated for. Each mother whose income was below a certain scale, irrespective of her physical condition, received per month 3 lb. of milky foods (Ostermilk, Ovaltine, or Colact) and ½ lb. of Marmite. These foods had been given during the last three months of pregnancy. There was some suspicion that the mother shared the milky foods with her family, especially with the young children, but the marmite she was more likely to take herself as she did not consider it so suitable for babies or the smaller children. The results up to June 30th, 1937, showed that among 10,384 mothers who had received the foods there had been a death-rate of 0·09 from puerperal sepsis (one maternal death) and among 18,854 mothers in the same areas who had not received the foods, there had been a death-rate of 2·91 from puerperal sepsis (46 maternal deaths). Cases of septic abortion had been excluded from the controls by counting only the deaths in the last three months of pregnancy. Maternal deaths from other causes had been rather less than half and infant deaths and stillbirths had been rather more than half those of the control series. The two classes of mothers might be considered fairly comparable. It was true that the Birthday Trust mothers received the foods from the antenatal centres, so they all had the advantage of antenatal care, while only some of the control series had this; but under present conditions it was not clear that antenatal centres, when taken in large groups, would have a lower rate of maternal mortality than other women of the area, owing to the greater proportion of abnormal cases and primiparæ. The foods given did not increase the proteins or calories of the diet to any great extent and the question arose whether the good result was due to a general improvement in nutrition and the power of resistance to disease due to the milky foods plus vitamins A, B, and D, or whether it was due to some other element that had a particularly beneficial effect on pregnancy and childbirth. Dr. Balfour suggested that the vitamin-B complex might act in this way by means of its action in increasing neuromuscular efficiency, in stimulating digestion and in preserving the integrity of the mucous membranes, so rendering the uterine passages more impervious to germs. A research committee composed of medical and scientific workers had recently been appointed by the Joint Council of Midwifery (of which the Birthday Trust Fund was one of the components) to carry on the future administration of the scheme. It was obvious that much more information was required to elucidate the results. Antenatal clinical officers were being asked to keep some records but it seemed desirable that research workers should be called in to assist at the clinics.

The PRESIDENT said he wished that Dr. Balfour could have provided her controls from within her own group, even at the cost of denying the foods to some of the women.

Dr. HELEN MACKAY thought, in view of the very interesting results obtained in the large-scale observation, the work should now be taken up in a somewhat different manner, by studying small groups of pregnant women intensively. She thought that in any intensive study observations were best made by the doctor or doctors responsible to the patient rather than by a separate observer. There was no doubt that remarkable results could be obtained by making good deficiencies in children's diets. It was therefore reasonable to expect that large reductions in the morbidity-rate of adults could be obtained in this country by similar means.

Prof. JAMES YOUNG said that the investigation in the depressed areas had been largely inspired by Lady Williams, and that the work throughout had been made possible through her enterprise and energy. It was difficult to explain the dramatic results completely on any other basis than that which Dr. Balfour had advanced. At the same time the reduction in the death-rate had been so great that it seemed almost too good to be true. The methods now in operation for checking the cases individually would, however, enable the exclusion of any fallacies that might have crept in. This matter had engaged the careful attention of the special committee of which he had recently been elected a member. Only 1 death from sepsis in 10,000 women who had received special nourishment was a very striking figure. At first sight it might almost suggest that the complicated technical detail in antisepsis and asepsis, which had grown up within recent times and which was regarded as an essential part of the prevention of sepsis, was hardly worth while. At the same time, as an obstetrician, he felt that until the evidence was overwhelming they could not assume that such a complete protection was obtainable from dietetic measures alone. There were many difficulties which might be quoted. In Rochdale it was known that the mortality had been reduced by 60 per cent. as the result of an intensive effort on behalf of the community, in which doctors, midwives, and patients were all concerned. This result was undoubtedly due entirely to an improvement in the obstetric service of the area and could not in any way be attributed to improvement in diet.

Dr. JANET VAUGHAN, commenting on the high incidence of anæmia in working-class women shown by Dr. McCance's work, described a carefully controlled series of observations made in America. Half the women had been given iron during the last four weeks of pregnancy and the others none. Those receiving iron had subsequently a hæmoglobin value over 70 per cent., but 24 per cent. of those without iron therapy had had a value below 70 per cent., representing a considerable degree of anæmia. Possibly the hæmopoietic effect of marmite might be a factor contributing to the results described by Dr. Balfour. She thought the additions to diet

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should be studied one at a time.—Mr. A. L. BACHARACH thought the Birthday Fund patients could not be studied by making one addition at a time, since multiple deficiencies and an integrative action between more than one added factor were likely to be responsible for the effects. If it were possible to reduce the mortality and morbidity to nothing every effective addition to diet should be made and the results analysed subsequently.—Prof. J. MARRACK regretted making up inadequate diets merely by medicinal means.—Dr. PAYNE wondered why milk should be such an essential article for the providing of calcium in the diet of adults.

In reply, Dr. MCCANCE pointed out that many animals after weaning chewed and consumed bones and the same was true of Eskimos. Herbivorous and indeed all mammals were liable to go into negative calcium balance during pregnancy and lactation.—Dr. BALFOUR agreed that whole meals might be more satisfactory than special additions to the diet, provided the necessary elements could be given in the meals at reasonable cost, and provided the mothers could be induced to attend outside centres in large numbers.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY

AT a meeting of this society on Jan. 7th, with Dr. G. RICE-OXLEY, the president, in the chair, a discussion took place on the causes and treatment of

Sterility or Infertile Marriage

Mr. EARDLEY HOLLAND described a routine that he had often found successful. It began with an investigation of the history and a cursory gynæcological examination, after which the woman was given a prescription of thyroid gland in graduated doses. This first stage included an examination of the husband; Mr. Holland refused to have anything to do with the case unless the husband coöperated. The second stage of treatment, after three months on thyroid, began with a more complete examination of the tubes, using Lipiodol injection, which was much more reliable than insufflation of air. In a proportion of cases the lipiodol injection opened hitherto blocked tubes. The third stage of treatment was by means of hormones. In the large proportion of cases where there was genital hypoplasia considerable doses of the follicular hormone (œstrin) might be given.

Mr. KENNETH WALKER said that where a marriage was childless it would usually be found that there were adverse factors on the side both of the male and of the female. The importance of such conditions as infection of the genital tract had been exaggerated; it was true that gonorrhœa could produce absolute sterility but in most cases of childlessness the condition found was merely impairment of fertility. Ten years ago in such a discussion he would have laid chief emphasis on local conditions; to-day he would lay it on constitutional troubles. Endocrinology offered some hope, though not every case was due to endocrine dysfunction.

Mr. V. B. GREEN-ARMYTAGE thought it important that medical officers and matrons of girls' schools should carefully observe the time of onset and type of menstruation. Hypoplasia did not begin at the age of 25 when the woman came to the gynæcologist; it began in early youth, and if care were taken at that period as to diet, exercise, and the giving of œstrogenic substances when necessary, subsequent infertility might be lessened. Mr. Green-Armytage was convinced that contraceptive measures in the early days of marriage were inimical to pregnancy later. Salpingography, he said, was carried out as a routine on the Continent, and if practitioners realised its ease and painlessness more cases of infertility would be investigated. It had the advantage over insufflation that it gave information as to whether both tubes were patent or only one, and whether there was any abnormality of the uterus.

Mr. F. J. MCCANN spoke of the damage done to the ductless glands in childhood by many of the exanthemata, the result being seen only after puberty. Irregularity of menstruation in the young girl should be looked upon as a serious condition demanding treatment, the treatment being first diet, secondly exercise, and thirdly medication. Mr. McCann added his strong belief that birth control measures did delay fertility for a considerable time, and might cause sterility. Birth control was the greatest menace to our race to-day, destroying the fertility of large numbers of women and not a few men.

INTERNATIONAL OPHTHALMOLOGICAL CONGRESS

THE fifteenth International Ophthalmological Congress was held in Cairo from Dec. 8th to 14th, 1937. The two main subjects discussed were, first, hypertension and retinal arterio-sclerosis, and, secondly, the relation of endocrinology to the eye.

Retinal Hypertension

Dr. H. P. WAGENER and Dr. NORMAN M. KEITH, of the Mayo Clinic, jointly presented the opening paper on retinal arterial hypertension. The ophthalmologist, they said, because of his wider and more intimate knowledge of the clinical details of retinal pathology, should be better equipped than the physician to observe the reactions in the retina that are associated with raised blood pressure and systemic vascular disease. If, as seems logical, the visible reactions in the retinal vessels are similar, though at times disproportionate, to the invisible reactions taking place in vessels of similar size throughout the body, it is clear that an explanation of the mechanism of these reactions in the retina will go far toward solving the mechanism of diffuse vascular disease. The responsibility of the ophthalmologist in the solution of this problem is great, and his opportunities are wide, for he is able to see these vascular changes from their inception and to study their modes of origin and progression.

Arterial hypertension is evidently an expression of a diffuse disease or abnormal condition of the arterioles throughout the body. The lesion of the arterioles results in an increase in the peripheral resistance in certain regions or in the whole of the arteriolar bed. The narrowing of the lumen of the arterioles, which is the apparent cause of the increased resistance, is not structural in the earliest phases of the disease. It must be regarded as due to increased tonicity of the vessel wall, to spastic constriction, or to a combination of the two. Whether the constriction is due to the action of a pressor substance directly on the arteriolar wall or through the medium of the sympathetic nerves, or simply to increased vasomotor stimuli is not known. If the causative factor of the arteriolar narrowing continues to operate, histological changes develop ultimately in various parts of the arteriolar system, for example, in the

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peripheral muscles, the heart, the kidney, the brain, and the retina. Both these factors, functional narrowing of and structural wall changes in arterioles, appear to be present in the usual case of diffuse arteriolar disease of the so-called "essential hypertension" type.

Dumas divided essential hypertension into three phases. In the silent phase the patient is essentially symptomless. In the second, the established phase, the disease has become organic and visceral lesions are present. Cerebral hæmorrhages, cardiac failure, or uræmia may terminate this stage. It is possible, however, for the hypertension to pass into the third or involutional phase, in which the blood pressure drops and arterio-sclerosis dominates the picture—the hypotensive stage of hypertension. According to Bonamour, the retinal changes in Dumas's first phase are spastic in type. The blood pressure in the central artery of the retina is likely to be elevated disproportionately to that in the brachial arteries. Patients may complain of transient loss of vision, but post-spastic thrombosis of the central artery may result in permanent loss. In the second phase, retinitis develops in cases that are running a rapidly progressive course. If the disease progresses more slowly, sclerosis develops in the retinal arteries as a defence reaction. In the final involutional phase, the sclerosis in the retinal arteries is likely to be severe, and lesions such as arterio-sclerotic retinitis and retinitis circinata are characteristic. In Bonamour's opinion, retinitis of the hypertensive type is essentially vasospastic in origin. As a result of arteriolar constriction reactional dilatation and stasis develop in the capillary bed and serous and hæmorrhagic transudations take place into the retina.

The problem of the pathogenesis of albuminuric retinitis has been a consuming one almost since the beginnings of our knowledge of albuminuria as an expression of disease of the kidneys. Bright himself recognised that loss of vision was a symptom in certain patients with albuminuria. Most physicians at present agree that there can be a retinitis "of albuminuric type" in cases in which no renal insufficiency can be demonstrated clinically, and in which at necropsy the kidneys show no evidence of primary nephritis. The most logical explanation of the mode of origin of albuminuric retinitis seems to be Volhard's, who regarded both the arteriolar sclerosis of Verwey and the retinitis as a result of ischæmia due to spasm in the larger arterioles. Volhard's conception of ischæmic or angiospastic retinitis seems to be more generally applicable than any other to the retinal complications of hypertension and nephritis and to permit a more ready comparison of these complications with the other features of the disease.

Dr. Wagener and Dr. Keith, in conclusion, described a condition that they had reported in 1928 and which they termed the malignant hypertension syndrome. The objective findings are persistently elevated blood pressure, diffuseness of arterial and arteriolar thickening throughout the body, and minimal changes in the renal parenchyma of kidney. The important retinal alteration is the marked spastic and organic narrowing of the arterioles, with diffuse retinitis and œdema of the discs. The characteristic symptoms are nervousness, asthenia, visual disturbances, dyspnœa on exertion. All observers are agreed that the patients of this group are in a very serious condition. A follow-up of 146 cases showed that 80 per cent. of them died within a year.

Dr. A. BAILLIART (Paris), dealing with the clinical part of retinal arterial hypertension, stressed the value of his dynamometer. This estimates the diastolic blood pressure in the retinal arterioles, which is about 40 per cent. of the diastolic pressure in the brachial arteries. The pressures as measured by his method furnish a ready and probably fairly reliable method of determining variations from the normal in pathological states.

Dr. Y. KOYANAGI (Japan) also contributed a paper.

Endocrines and the Eye

The discussion on endocrinology and its relation to the eye was opened by Prof. JOSEF IMRE (Hungary). He said that recent investigations have shown that various disorders of the sexual glands are associated with pathological changes occurring in the eyes. Periodic hæmorrhages of the subconjunctival tissue, recurring conjunctival inflammations or, especially, phlyctenular kerato-conjunctivitis are not rarely found in close relation to menstruation. Filamentary keratitis, following atrophy of the lacrymal glands and often combined with arthritic processes, as a rule develops in women with ovarian disorders or in the beginning of climacteric. Keratoconus has been shown in many instances to be a manifestation of disorders of the thyroid gland and the gonads. Prof. Imre thought that there is a close connexion between acute and chronic glaucoma and abnormal folliculin production. The folliculin production of four glaucomatous patients, examined by reliable biological methods, proved to be exceedingly low, but the amount of prolan was normal. He pointed out that there is an undoubted connexion between the changes of the intra-ocular tension and the pituitary during pregnancy. Patients suffering from retinitis pigmentosa are treated nowadays with œstrin and in many cases improvement follows and the progress of the disease is arrested.

Other opening papers were read by Dr. SNAPPER (Holland), Dr. VON SZILY (Germany), Dr. JEANDELIZE and Dr. DROUET (France), and Dr. LE CASCIO (Italy).

THE LANCET 100 YEARS AGO

January 20th, 1838, *p.* 605.

From a leading article.

We have recurred so frequently to, and dwelt on, at such length, in the pages of this Journal, the manifold abuses of the system of medical instruction recognised in this country, that it is difficult to discover any new enormities which are left for us to expose and denounce. Our Medical Corporations, however, represent so many beds of corruption, in which rank weeds spring up with surprising fertility, that if we now return to evils which have many a time exercised our pen, it is because the public mind is familiarised with their magnitude, and therefore most eager for their reform. We return to them at this period, especially, when the curriculum of the *London University* is most probably on the eve of being issued. . . .

Our first topic—our favourite one for attack, because it is the strong hold of the enemy—is the CERTIFICATE SYSTEM, that incarnation of all which is absurd in principle, abortive and useless in practice, and foully dishonest in object. *Absurd* in principle: for what matters it where knowledge is acquired, provided it be comprehensive and sufficient? Is there a virtue in some stone walls above others? Does learning alight on a man because he has walked certain hospitals . . .? Senate of the *London University*, annihilate this unworthy system of certificate-mongering; . . . do away with certificates, and you at once secure a new system among our hospital physicians and surgeons. All will be changed: you will have activity instead of sloth; care, instead of slovenliness; regular attendance, instead of random visits; while the pains now taken in escaping from the delivery of lectures will be employed in preparing them.

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REVIEWS AND NOTICES OF BOOKS

Pulmonary Tuberculosis in Practice

A Modern Conception. By R. C. WINGFIELD, M.B., B.Ch. Oxon., F.R.C.P. Lond., Medical Superintendent, Brompton Hospital Sanatorium, Frimley; formerly Tuberculosis Officer, St. Thomas's Hospital. London: Edward Arnold and Co. 1937. Pp. 122. 9*s*.

THIS book has been designed, as the preface explains, to bridge the gap between the general practitioner and the specialist whose coöperation is essential if pulmonary tuberculosis is to be diagnosed early, efficiently treated, and finally eradicated. The work has been divided into three sections. The first describes the development of the tuberculous lesion from the primary focus to the advanced disease of the terminal stage. Dr. Wingfield elaborates his own scheme with the aid of a diagram at the end of the book and a series of letters to denote the pathological elements that compose the lesion at its various stages, thus, T is used to denote a fibrocalcareous tendency, I the spreading disease or granuloma, while X signifies the presence of secondary infection. The advent of cavitation is indicated by adding "cav" to the symbol. It is not difficult to follow, at least for the specialist. The general physician would do well to study it carefully; for by so doing he will acquire a sound and practical knowledge of the natural history of the tuberculous focus that will stimulate his interest in the disease as a whole even if, in practice, he finds himself confronted mainly with TIX and TIX cav lesions.

In the second section Dr. Wingfield discusses the symptoms, signs, and treatment of the stages previously described. He supplies a helpful and impartial account of the management of a case of phthisis, making it clear when specialist assistance should be called in. The importance of radiology as opposed to physical signs in early diagnosis is justly emphasised in accordance with the modern phthisiological slogan that the tuberculous focus, like the small boy of Victorian days, should be seen and not heard. There are two points that call for comment. The account of the treatment of the cavitated open spreading fibrocaseous (TIX cav) lesion leaves the impression that thoracoplasty should follow hot-foot upon the heels of a failed pneumothorax as being the logical sequence of a decision that collapse is desirable. While, as the author suggests, it may be "bad medicine" to await the improbable "miraculous spontaneous cure" yet a few months of firm encouragement in a good environment will do much to check the spread of the disease and increase the T element at the expense of I. In our view thoracoplasty should only be considered when the maximum benefit has been attained from such a régime. Again, Dr. Wingfield's conception of recurrent infections of tuberculous cavities with the streptococcus as the explanation of periodic sharp febrile attacks with changed physical signs and diminished sputum output will not go wholly unopposed. A similar syndrome is common in chronic lung abscess when the bronchus draining the cavity becomes blocked and the pus is imprisoned. It is an indication for bronchoscopy. The secondarily infected quiescent tuberculous cavity (TX cav X lesion) and the chronic lung abscess, although ætiologically distinct, have become clinically identical.

The last section of the book is devoted to the treatment of certain special aspects and complications of phthisis in which the chapter on hæmoptysis deserves special praise. In a word, this is an excellent book. The general practitioner who reads it with attention is likely to find his approach to pulmonary tuberculosis profoundly changed.

Chemical Methods in Clinical Medicine

Their Application and Interpretation with the Technique of the Simple Tests. Second edition. By G. A. HARRISON, B.A., M.D., B.Ch. Cantab., M.R.C.S. Eng., Reader in Chemical Pathology in the University of London. London: J. and A. Churchill. 1937. Pp. 585. 21*s*.

THE book provided on its first appearance a new and useful bridge between the biochemist and the clinician; it soon became "Harrison" and found a place, not only on the shelf, but on the bench and desk. In its second edition the same general plan is maintained. Biochemistry as applied to diagnosis and treatment is discussed adequately although not comprehensively. No attempt has been made to rival such exhaustive reviews as those of Peters and Van Slyke; brevity and simplicity is the note struck and repeated. New tests are included, and those developments in biochemistry which have been applied successfully to medicine, such as zinc protamine insulin, and ascorbic acid. Several sections have been revised and extended. The scope and usefulness of the book have been greatly increased without an appreciable increase in its length.

The attempt to avoid complexity is sometimes carried too far; in order to make some chemical definitions and conceptions appear easy to grasp, Dr. Harrison has sometimes yielded to the temptation to distort them. Terms which in chemistry have a precise meaning are sometimes used loosely and even in a wrong sense—e.g., in the introductory definition of terms and description of standard solutions. Some of the sections on physical chemistry, such as that on *p*H, are poorly written. In his introductory remarks on the selection of methods of analysis Dr. Harrison says that "strong objection is taken to the phrase 'Good enough for clinical work'" (p. 2); but in some places he himself seems to be influenced a little by this objectionable maxim. Some of the methods described are or should be obsolete—e.g., Fehling's and Nylander's tests, Aufrecht's protein method, the Ewald test-meal; while certain new developments, like phosphatase, are only sketched in. Hesitation in discarding old and trusted procedures for new untried ones is commendable, but has perhaps been carried too far; the technique given for bilirubin tests and the old Brigg's method for phosphate should have been replaced by more modern procedures.

The best feature of the book is the emphasis on the medical aspects of the subject. The details of the tests selected, their interpretation, and their relation to the clinical condition are mostly presented with great skill and judgment. Some simple illustrations are included to help students and practitioners to grasp the more obscure physiological processes; for example, the picture of a man snatching eggs at a variable rate from baskets on an endless chain (p. 84) gives a clear notion of the urea clearance of blood by the kidney. Examples are given of all the more complicated calculations in the methods of

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quantitative analysis, so that there should be no difficulty in following the arithmetic. All the pictures are good; they explain, more clearly than would be possible in words, the manipulations of the laboratory to the clinician, and those of the hospital ward to the laboratory worker.

Radiation Therapy

Its Use in the Treatment of Benign and Malignant Conditions. By IRA I. KAPLAN, B.Sc., M.D., Clinical Professor of Surgery, New York University Medical College. London: Humphrey Milford, Oxford University Press. 1937. Pp. 558. 30*s*.

THIS book appears as a new publication, but may be regarded as an enlarged and up-to-date edition of the author's "Practical Radiation Therapy," published in 1931. Dosage is discussed in relation to biological effects. X ray doses are given in "r" units without back-scatter, so that they are comparable, but radium dosage is still in terms of milligramme hours, or millicuries destroyed. Such units prevent discussion of the doses given to different types of tumour from being of value, and they suggest an explanation why the controversial subject of radio-sensitivity is dismissed as if the tables of radio-sensitivity quoted from other authors might be accepted as proved fact. The chapter on applied X ray physics by Carl B. Braestrup is on conventional lines but is sound and clearly written; it includes a description of apparatus for contact therapy and some notes on protection. The rest of the volume consists of a list of conditions treated by radiation. It is beautifully illustrated, and shows some good results. The large number of interesting rare cases treated at the clinic, together with the author's great experience in the commoner conditions, give value to the clinical chapters. It is unfortunate that old illustrations have been used, showing interstitial radium arranged in a radiating fashion like the spokes of a wheel, for this is a method now universally condemned. Special attention is drawn to a page of photographs of children born to mothers treated for sterility by stimulating doses of X ray delivered to the ovaries, sometimes accompanied by smaller doses to the pituitary. The author says that the method of treatment is "a very delicate modality, requiring judgment based on training and experience." It is not likely that many radiologists will emulate him, in spite of the surprisingly satisfactory results, which show that 44 out of 131 patients treated subsequently gave birth to living children.

The Cerebro-spinal Fluid

By H. HOUSTON MERRITT, M.D., and FRANK FREMONT-SMITH, M.D. London: W. B. Saunders Company. 1937. Pp. 333. 22*s*. 6*d*.

THIS book, based on 21,000 specimens of cerebro-spinal fluid examined in the cerebro-spinal fluid laboratory of the Boston City Hospital, commands attention rather by the authoritative statements made in it than by the presentation of new facts. The range of material is wide, and careful attention has been paid to detail in its examination. It is twenty-five years since Mestrezat published his pioneer studies on the chemistry of the cerebro-spinal fluid and nearly twenty since Ayer introduced cistern puncture. Since that time the clinical examination of the cerebro-spinal fluid by exact chemical methods, and the reason for the changes which it undergoes in disease have been intensively studied in the Boston City Hospital, and this book is an epitome of the work. In this large general hospital the fluid has been examined in many forms of disease other than those in which the nervous system is primarily involved, and the results of these examinations form the most interesting part of the book. In the section describing these, as well as in some others in which special emphasis is laid on the alterations in the chemistry of the fluid, the researches of other workers have been somewhat neglected, and although the bibliography is extensive, filling 33 pages, it does not include some important observations by English workers on the chemistry of the fluid in nephritis, meningitis, and other conditions. It is perhaps too much to expect that the authors should make an exhaustive analysis of their findings in every form of disease in relation to the work of others, but a careful survey of this kind might have prevented several ambiguous statements.

The book has practical value as a clear statement of the changes in the fluid which may be expected in every form of disease in which it is affected.

British Journal of Children's Diseases

IN the October–December issue Dr. F. R. B. Atkinson contributes a comprehensive article on Niemann-Pick's Disease, which he defines as a congenital, familial disease, confined to children, affecting chiefly the Jewish race and females more than males. It is characterised by enlargement of the liver and spleen with progressive pigmentation of the skin. The disease is the result of a constitutional disorder of the lipoid metabolism, especially of the phosphatides, and is always fatal. Only 42 cases have been recorded, of which a short résumé is given with particulars of the blood and chemistry in tabular form. There is also an extensive international bibliography.—In a paper on Congestive Heart Failure in Whooping-cough Dr. A. R. Thompson records the case of a girl aged 4 suffering from whooping-cough complicated by broncho-pneumonia, acute carditis, and extreme congestive heart failure with general anasarca. She was successfully treated by intramuscular injection of an organic mercurial diuretic in the form of Novurit. The pathology of congestive heart failure is discussed in relation to the present case and previous reports are reviewed.—Dr. L. J. M. Laurent records a case of Hæmophilia with Fatal Spontaneous Hæmorrhage from Pharyngeal Abscess. The patient was a male infant aged 9 months admitted to a fever hospital certified as suffering from nasal diphtheria. For four days he had been having some difficulty in swallowing, and on the day of admission he had developed a slight but persistent epistaxis. A culture of the nose was negative and no membrane was seen in the throat, but a swelling was found on the right side of the pharynx from which blood and pus were escaping. A diagnosis of right lateropharyngeal abscess was made, and the child was put to bed with the head low, and frequent small nasal instillations of adrenaline were given. A few hours later blood gushed out of the mouth and nose, and he died within two minutes. The necropsy showed an abscess cavity on the right side of the pharynx containing a good deal of blood, some broken down tissue, and a little pus. A search was made for an erosion of the jugular vein, internal carotid, external carotid, and its branches, but none could be found. Subsequently however a familial history of bleeding was obtained. Reference is made to similar recorded cases.

The abstracts from current literature are devoted to tuberculosis.

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THE LANCET

LONDON: SATURDAY, JANUARY 22, 1938

EARLY TO RISE

OUR Rumanian correspondent has lately been writing about the way in which Prof. LIVIN CAMPEANU hurries his patients out of bed after operations. Some visiting surgeons, our correspondent says, were astonished to see people walking about on the day after appendicectomy and three days after radical cure of inguinal hernia. Such a sight would certainly seem remarkable to most of us, but CAMPEANU is actually only the latest of a number of medical men who have liked to see their patients on their feet again at the first possible moment after an abdominal operation. It is arguable, and argued, that prolonged immobilisation after laparotomy is just as unnecessary and just as harmful as prolonged immobilisation after fracture, and that early movement is as useful in the one case as in the other. The analogy however should not be applied without reserve, for there are important differences to be borne in mind.

In the first place a fractured limb is usually a healthy limb before the accident, whereas the abdomen has usually been diseased for a considerable time before a restorative operation is even contemplated. Of course, when we have to deal with an acute abdominal disease, such as acute appendicitis, acute cholecystitis or intestinal obstruction, the abdomen itself may have been previously healthy; but here the patient will probably be suffering from a toxæmia that precludes early mobilisation; he must have rest in which to recover from his bacterial infection. Then again, a man's health may be undermined by the loss of nutrition caused by a gastric or duodenal ulcer that has troubled him for years. If on top of this he undergoes the large operation of resection of the stomach, which is a further drain on his reserves, it will be out of the question to get him out of bed within the next few days. Indeed the best that could happen to him is that he should sleep for a week while his tissues are undergoing the necessary restorations and repairs. Thus the practice of early rising after abdominal operations appears appropriate only when the body operated on is comparatively healthy. This is more or less the state of affairs when the appendix is removed during the interval between attacks of appendicitis or when a hernia is repaired, and many surgeons in this country do in fact get the patient quickly out of bed after such operations. But naturally there are other considerations too. No abdominal operation can be performed without dividing the structures of the abdominal wall; these must grow together again, being held in apposition by sutures that are never more than scaffolding or splints; and the biological history of a healing wound is at least three weeks. It takes time for granulation tissue to turn into white fibrous tissue strong enough to withstand any strain, and a patient who is up and about may easily by some sudden movement, or a slip, put a strain upon his wound which at an early stage it is unable to bear. Such a strain is not likely to do much harm where the surgeon has used a muscle-splitting or transverse incision for an appendicectomy, but where the incision was paramedian the stress will always be at right angles to the cut. Nor can the fragility of the closing wound be reduced by putting sutures closer together; this will increase its strength for a couple of days but will lessen it thereafter, because it will reduce the blood-supply by strangulation of more vessels supplying the edge of the wound from which repair must take place. Movement will no doubt improve the circulation through the damaged abdominal wall and thus favour repair, but the patient can get enough of this movement by turning about in bed. True, this is not so encouraging mentally as return to normal upright posture; the psychological reasons for early rising are substantial, for the patient who is out of bed soon ceases to think himself an invalid and this is an aid to rapid convalescence. On the other hand, to some patients an abdominal operation of any kind is an emotionally exhausting experience and they need physical rest before they can get over it. They have neither the power nor the fortitude to leave their beds early, and if they attempt to do so their convalescence may be very much prolonged. A laparotomy is no small ordeal to many a sensitive person, and early rising is not likely to appeal to any save the robust and resolute.

The really serious argument in favour of getting the patient up quickly is that it may save him from thrombosis and pulmonary embolism. Perhaps it would be well indeed if most surgeons were to go a little further in Prof. CAMPEANU'S direction. Both in theory and in practice, however, it should be perfectly possible to secure for the patient, while still lying in bed, enough movement to prevent the venous stagnation that is held largely responsible for thrombosis and its deadly sequel. The difficulty is that exercise of this kind must be deliberately arranged and may be forgotten; whereas an ambulant convalescent can scarcely fail to provide it for himself.

VITAMIN D_2 AND VITAMIN D_3

IT is a pity, but there is now no doubt at all that vitamin D, which protects against rickets, exists in more than one chemical form. The actual number of forms is uncertain and is chiefly of academic interest, but there are at least two that are of general importance and WINDAUS has called them vitamin D_2 and vitamin D_3. They are the purified products of ultra-violet irradiation of ergosterol and 7-dehydrocholesterol respectively. The synthesis of the latter by WINDAUS and his colleagues [1] was a masterly achievement.

[1] Windaus, A., Lettré, H., and Schenck, Fr., *Liebigs Ann.* 1935, **520**, 98.

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The discovery of rich natural sources of vitamin D in the halibut, tunny, blue-fin tunny, and sword-fish has made it possible for HANS BROCKMANN [2] to isolate the vitamin from liver oils, and he has shown that the antirachitic vitamin occurring in Nature is identical with vitamin D_3 (irradiated 7-dehydrocholesterol). In cod-liver oil vitamin D is present only in comparatively small quantities, and its isolation from this source presents extraordinary difficulties; but hardly any doubt is felt that the vitamin D of cod-liver oil, too, is D_3. The first suspicion that natural vitamin D and the vitamin D of irradiated ergosterol are different intruded itself in a rather curious way. Vitamin D is much used in the poultry industry for prevention of leg-weakness in baby chicks and also onwards throughout the fowl's life. When irradiated ergosterol began to be employed for this purpose in America it was noticed to be much less effective than cod-liver oil; that is to say, if solutions of cod-liver oil and irradiated ergosterol were standardised with rats so that they had equal antirachitic potency, it might be found that twenty times as much of the irradiated ergosterol solution had to be given to chicks to produce the same protective or curative effect in rickets as was produced by the cod-liver oil solution. This observation was confirmed again and again, and experiments with purified vitamin D_2 and vitamin D_3 show that the difference is inherent in the substances and is not due to any extraneous circumstances.

The medical practitioner will at once ask how the human being, particularly the human infant, reacts. Not like a chicken, one can answer at once; but it is less easy to say for certain whether it reacts exactly like a rat or a little differently. Many attempts have been made in the United States and in Canada to try to decide whether cod-liver oil, irradiated ergosterol, irradiated milk, and other antirachitic materials are all equally effective in treating infantile rickets. Some workers thought that when the sources of vitamin D were standardised with rats irradiated ergosterol had about half or a third of the potency of cod-liver oil, while others could detect no difference. Of these studies that of MARTHA ELIOT and her colleagues [3] was the most impressive, and her conclusion was that there was no detectable difference. The truth of course is that all biological tests with animals are subject to a large error, so that one cannot be sure that the answer to the question posed is not really half or twice that which one has found. This is true even when one is using littermate rats of the same sex; but when one is using as test animals human infants of different age and mixed origin, whose general welfare must be the first consideration throughout, it is almost if not quite impossible to decide a question of a two or three to one difference. HERBERT BROCKMANN [4] has tried to arrive at an answer by treating rachitic infants with pure vitamin D_3 at the university pædiatric clinic in Würzburg, and he reports that this vitamin is at least twice as potent for infants as vitamin D_2. But his conclusion is open to grave criticism. He made no simultaneous comparison with vitamin D_2; moreover, he assumed that the daily dose of vitamin D_2 commonly given in Germany, 0·2 mg., or 8000 international units, is the minimum curative dose, and gave half or two-thirds of this dose of vitamin D_3 which brought about successful healing. The Addendum 1936 to the British Pharmacopœia 1932 gives 2000–3000 international units daily as the curative dose of irradiated ergosterol (vitamin D_2) for an infant, an amount below the amount of vitamin D_3 given by HERBERT BROCKMANN. In addition, no series of negative controls was included in this study, and owing to the curative effect of changes of season such a control series is regarded as indispensable in any finer quantitative studies. The conclusion reached by HERBERT BROCKMANN may be correct, but it is not justified by the data he presents and the medical profession should be wary in accepting the assumption that vitamin D_2 and vitamin D_3 have differing potencies for human beings. The point is one that it may be impossible to settle, owing to the difficulty of making quantitative tests with babies; but careful experiments with monkeys might give a definite answer that could be applied to infants with reasonable confidence.

[2] Brockmann, Hans, *Hoppe-Seyl. Z.* 1936, **241**, 104; Brockmann and Busse, A., *Ibid*, 1936, **245**, 96; 1937, **249**, 176.
[3] Eliot, M. M., Nelson, E. M., Barnes, D. J., Browne, F. A., and Jones, R. M., *J. Pediat.* 1936, **9**, 355.
[4] Brockmann, Herbert, *Klin. Wschr.* 1937, **16**, 1383.

OXYGEN-LACK IN MENTAL DISORDER

AT last year's annual meeting of the Royal Medico-Psychological Association the importance of anoxæmia in mental disorder was emphasised by a number of speakers long familiar with one or other aspect of the problem—Prof. F. L. GOLLA in his studies of the respiratory control of the acid-base relationship in the insane, Dr. F. A. PICKWORTH from the histological side, Dr. ALFRED MEYER in his work on the action of poisons and the oxidative activities of different parts of the brain, and Dr. E. GUTTMANN on the relation of anoxæmia and alkalosis to anxiety.[1] Investigation is also being actively pursued in the United States, as by MYERSON and his collaborators in Boston, the schizophrenia research group at Worcester, and elsewhere by HINSIE, GILDEA, MCFARLAND, and others. From Chicago [2] now comes a study of the arterial oxygen saturation in neurocirculatory asthenia. After emphasising the dearth of such observations on normal people and the variability of the normal findings, HICK and his colleagues describe the supplementary methods they employed (estimations of venous lactic acid before and after breathing oxygen, and of oxygen-consumption when breathing air and when breathing oxygen). The findings in 10 subjects with decompensated heart disease and in 8 normals were compared with those in 13 patients who had a neurosis of the "neurocirculatory asthenia" type. (The figures in only 6 of these cases, however, are tabulated.) In these 13 the

[1] Symposium on the Circulatory System and Mental Disorder, *J. ment. Sci.* 1937, **83**, 505.
[2] Hick, F. K., Christian, A. W., and Smith, P. W., *Amer. J. med. Sci.* December, 1937, p. 800.

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blood leaving the lungs had an inadequate amount of oxygen; moreover, the respiratory quotient and oxygen-consumption altered when the patient breathed oxygen instead of air. The authors conclude that in these neurotics there is an actual oxygen deficiency of pulmonary origin, which accounts for their fatigue. It would have been useful if they had combined with their lactic-acid estimations an investigation of the glutathione content. The well-known difficulties in the way of interpreting lactic-acid variations, to which they seem to have given too little attention, make it instructive to compare their findings with those of earlier workers such as LOONEY and CHILDS,[3] whom they do not mention.

In a communication from the fatigue laboratory of Harvard University THOMPSON, CORWIN, and ASTE-SALAZAR [4] report that the differences in schizophrenic subjects between the gaseous content of arterial blood and that drawn from the internal jugular vein are remarkably consistent—more so than in a normal control group—and that they found no single physiological anomaly tested by them to be characteristic of the schizophrenics, inasmuch as occasionally they found also in members of the normal group high arterial carbon dioxide and low oxygen saturation, large differences in the gaseous content of the venous and arterial blood, and other variations. Fixity of the physiological processes which would, somewhat paradoxically, make physiological equilibrium difficult, was all that they could establish as peculiar to the schizophrenics, and they regard it as probably a constitutional phenomenon which precedes the actual illness.

Hard upon the heels of these reports comes an informative review by HOSKINS [5] of the work done during the past decade at Worcester, Mass., on oxygen metabolism in schizophrenia to which we have already alluded. The chief findings were the abnormally low range of the rate of oxygen-consumption (Benedict-Roth) and of blood volume, when this is referred to the surface area; the circulatory rate, measured by the cyanide arm-to-carotid method, was only 80 per cent. of the normal; the glutathione and lactic-acid levels in the blood were unduly closely related; and the patients were less responsive than normal persons to metabolic stimulants such as thyroid and dinitrophenol. HOSKINS thinks that the next step should be the study of the oxidative tissue reactions of material obtained at biopsy; one might object to this that there are not yet adequate normal data for comparison. He says, more dubiously, that the defective oxidation in schizophrenia may be due to abnormal metabolites in the internal milieu, which serve as anticatalysts at some stage in the oxidation sequence, and that it may be possible to detect these, using normal living tissue as the reactive system. Any work of this sort done on schizophrenia would require very critical scrutiny.

[3] Looney, J. M., and Childs, H. M., *J. clin. Invest.* 1934, 13, 963.
[4] Thompson, J. W., Corwin, W., and Aste-Salazar, J. H., *Nature*, Dec. 18th, 1937, p. 1062.
[5] Hoskins, R. G., *Arch. Neurol. Psychiat., Chicago*, December, 1937, p. 1261.

INFANTICIDE

WRITING on her experience as a magistrate in cases of puerperal insanity, Mrs. R. H. CROWLEY comments [1] on the unfortunate emphasis at present laid on the criminal element. A mother suffering from puerperal insanity kills her baby and perhaps attempts suicide. These are two indictable offences. The police are brought in. When well enough to be charged, she is taken to the police-station where the charge is read over and explained to her. She is then brought before the local magistrates and, in the London area, is probably committed to Holloway pending trial at the Central Criminal Court. The result may be a sentence of detention at a criminal lunatic asylum "during His Majesty's pleasure," or, if her family can afford to pay for it, release on condition that she enters a mental hospital for treatment. Mrs. CROWLEY'S experience as a magistrate leads her to think that the medical aspect is too little considered. Incidentally she mentions seeing a few years ago in one of our provincial prisons an obviously distraught young woman in a cell with one side consisting of upright iron bars, caged like some savage animal. Inquiry of the prison governor elicited the information that this was a young mother awaiting trial for infanticide apparently committed under the influence of puerperal insanity. These were the conditions in which the community detained her for observation and presumably for treatment.

Puerperal insanity is said to occur approximately once in every 700 labours, usually within six weeks of confinement. Lactational insanity comes later and is less severe. The law still treats as murder the case where a mother deliberately kills her baby. These cases seem to be rare. The latest available criminal statistics show that only eleven persons were prosecuted in the year for murder of a child under one year of age. Out of this total (which was not restricted to mothers) nobody was found guilty of the major offence of murder. If a verdict of murder is returned, the judge must pass sentence of death, though the capital sentence is not going to be inflicted. In 1922 the Infanticide Act made it possible to pass a non-capital sentence, as for manslaughter, where the victim was a newly born child and where the mother, at the time of the wilful act or omission which caused its death "had not fully recovered from the effect of giving birth to such child and by reason thereof the balance of her mind was then disturbed." Unfortunately this effort of humanity, enacted mainly at the instance of judges who detested the duty of the death sentence, was largely negatived by a decision of the Court of Criminal Appeal. In R. *v.* O'Donoghue the trial judge was held to have been correct in deciding that, where a baby was born on August 19th and the mother took its life on Sept. 21st, there was no evidence fit to be left to the jury on which they could be asked to hold that the baby was "newly born" within the meaning of the Act. Lord DAWSON'S Infanticide Bill, which appeared in print just before Christmas,

[1] *Policewoman's Review*, December, 1937, p. 72.

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proposes to eliminate the word "newly born," and to substitute for the words in the 1922 Act already cited the words "had not fully recovered from the effect of giving birth to such child, including the effect of lactation following upon such birth, and by reason thereof the balance of her mind was then disturbed." The Bill also contains a proviso to make clear that its provisions may apply up to the time when the child is twelve months old. This is a most desirable reform, but it still does not wholly cover Mrs. CROWLEY'S point—namely, that the accused mother is a fitter subject for observation and treatment in a mental hospital than in a prison cell. It seems indeed unjustifiable that such cases should be remitted to any place associated with the custody of criminals.

The effect of prison must be deplorable; even worse perhaps is the prospect and the ordeal of trial in the Central Criminal Court. There seems no reason why the administration of justice should not find a better way; recourse to statutory amendment of the law may not be essential. Suicide is no longer dealt with under the rigid routine of criminal justice. Parliament has not altered the law, but the police and the magistrates have quietly reformed it. In the introduction to the Criminal Statistics for 1930 we were told that in recent years it has not been the practice to prosecute for attempted suicide unless special reason exists. The special reason is usually interpreted as meaning the need to place the patient in custody for his own protection. The accepted modern practice in respect of attempted suicides is hospital first, and criminal prosecution either afterwards or, far more commonly, not at all. Infanticide, to use the word in a general and non-statutory sense, might well be dealt with in the same spirit. Like all other proposals for reform, the problem may prove less simple than the reformers suppose. The authorities concerned with the administration of criminal justice cannot be expected to overlook the occasional instances of the wilful murder of the unwanted child. The father of the child may resent the suggestion of the certification of his wife, or her commitment to a mental hospital in respect of what may prove a brief period of delirium, quite as much as public opinion resents the present arrangement of commitment to prison. The shorter the period, the greater perhaps would be the difficulty. The provision of suitable accommodation in an appropriate hospital may be the main crux. The prison medical service is enlightened and humane; it commands the confidence of the courts and of the public. The prison infirmary, however, is scarcely the ideal place for patients suffering from puerperal psychosis. These difficulties must be faced. The community cannot be satisfied with a system which sees in the distraught mother just another criminal lunatic.

ANNOTATIONS

POSTHUMOUS HONOURS

IT has been suggested that admission to the Dictionary of National Biography carries with it a passport to Heaven; if this is going too far, at least any "Worthy" (the dignified term applied in the index to those whose names are included) achieves an enviable measure of temporal immortality. The supplement now issued [1] covers the toll of less than a decade (1922–1930). Doctors may find just cause for pride in the number of their colleagues portrayed in this distinguished gallery. The first we meet is John George Adami, who did much to forge the link between pathology and clinical medicine; other pathologists honoured by a place include Samuel George Shattock, one of the first to give whole-time service to his subject, and Adrian Stokes who died at 40 of yellow fever whilst investigating that disease at Lagos. Physiology is represented by John Newport Langley, Noël Paton, William Bayliss, and Ernest Starling, names familiar to every medical student. A pharmacologist, Arthur Cushny, and a bacteriologist, William Leishman, complete a formidable list of laboratory workers. Louisa Aldrich-Blake, the first woman to become master in surgery in the University of London, was best known as the dean of the London (R.F.H.) School of Medicine for Women in its years of great development during the war. Among the physicians, Clifford Allbutt will be remembered for many reasons, not the least, perhaps, for his "scholarly care in the use of words." Next, in alphabetical order, come William Selby Church and Dyce Duckworth—two wise and whole-hearted physicians—and David Ferrier whose work on the localisation of cerebral functions made modern neuro-surgery a practical possibility. Here also are James Mackenzie, the general practitioner turned cardiologist; Patrick Manson, the father of tropical medicine; Frederick Mott, neuro-pathologist; Richard Douglas Powell, physician-in-ordinary to Queen Victoria; and John Thomson, the pædiatrician. Among the surgeons we find the names of Anthony Bowlby, Rickman Godlee, William Macewen, Thomas Teale, and, lastly, Frederick Treves, who wrested "perityphlitis" from the medical wards and cured it by surgery. Here also will be found Mary Ann Scharlieb, one of the first women gynæcological surgeons and, no less fittingly, Francis Champneys, one of the last of the obstetric physicians. Oto-laryngology is represented by Arthur Cheatle and William Milligan. But there remains a small group consisting of those who, having qualified in medicine, subsequently played truant and excelled in other spheres of activity. Such were Stephen Paget, who combined surgery with biography and the writing of essays, and Hugh Kerr Anderson, who started as a physiologist and came to wield, as Master of Gonville and Caius College, an influence which was the greater for his sensitive and modest bearing. John Kirk forsook medicine for natural history; Alexander Wollaston for exploration; Thomas William Smartt for politics; and Arthur Conan Doyle and Robert Bridges for letters. Edward Granville Browne turned his medical knowledge to good account in his oriental researches.

Doubtless, in a brave new world, it would be decreed that books of reference should be dull, lest, as with this one, the earnest student might be distracted from the matter in hand by the fascination of the text adjacent, but not relevant, to his parti-

[1] Edited by J. R. H. Weaver. London: Humphrey Milford, Oxford University Press. 1937. Pp. 962. 28s.

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cular study. It is indeed difficult to content oneself with dipping into this book; the temptation is to read it right through.

AGREEMENT AMONG CARDIOLOGISTS

DURING the past few years the study of electrocardiograms taken with one electrode over the heart has shown that the curve obtained in this way is a valuable supplement to those obtained with the ordinary limb leads. Such a lead seems likely, indeed, to become part of the routine procedure of electrocardiography. Unfortunately a variety of methods of applying both the precordial and the indifferent electrode have been used, and the method of connecting them to the recording instrument has likewise varied, as well as the site of application of the precordial electrode itself in relation to the heart. For some time it has been realised that the confusion caused by these variations in technique and terminology must be resolved, and if the recommendations now made by a committee of the Cardiac Society, in collaboration with a committee of the American Heart Association, are generally adopted this end should be achieved. The Cardiac Society of Great Britain and Ireland is a body of some 60 or 70 members well qualified to speak for cardiologists in this country, and the same may be said of the American Heart Association for the U.S.A. By the method recommended (see p. 221) a relative positivity at the precordial electrode will produce an upward deflection, and this has the great advantage that the waves are usually in the same sense as those of the limb leads. The recommendation applies only to a single precordial lead, and the technique adopted with multiple leads, which are hardly practicable in routine work, must be left to the individual investigator.

POLIOMYELITIS IN NEW YORK

Dr. Alfred E. Fischer and Dr. Maxwell Stillerman [1] record their observations on 686 cases of acute poliomyelitis at the Willard Parker Hospital during the epidemic in 1935 when 2054 cases were notified in New York City. About the middle of July a greater seasonal prevalence of poliomyelitis than usual became evident, and the reported cases thereafter increased daily until the peak of the epidemic was reached in the last week of August. The decline began in September and continued in October, so that the seasonal curve exactly corresponded with that of previous outbreaks in New York. As regards the age-incidence of the 686 cases, about a third were under five years and three-quarters under ten; the oldest patient was aged forty-eight. Males (413) were affected more than females (273). In only 17 families (2·5 per cent.) did more than one case occur, so that communicability was low, and only 1 case of a second attack was noted. Non-paralytic forms were recognised more often than in previous epidemics. In such cases the symptoms were fever, vomiting, pain in the back of the neck, and other symptoms of meningeal irritation, and the spinal fluid contained at least 20 cells per cubic millimetre. Of 282 patients admitted to hospital without signs of paralysis only 57 afterwards developed paralysis. Treatment consisted in absolute rest in the early stage. After the temperature had been normal for several days and the tenderness of the muscles had disappeared plaster casts and splints were applied. After three weeks the patients were sent to their homes or to an orthopædic hospital if further treatment was required. The Drinker apparatus was used in 18 cases for respiratory distress, which in 8 was due entirely to weakness or paralysis of the muscles supplied by the thoracic or cervical segments of the spinal cord, while 10 showed evidence of bulbar as well as of thoracic involvement. Of the first group 6 survived, but in the second only 2. The fatality-rate for the Willard Parker Hospital cases was only 2·6 per cent. (18 cases), the lowest ever recorded in New York City. Of these 18 patients, 11 died in the first week.

[1] *Amer. J. Dis. Child.* 1937, **54**, 984.

MORTALITY EXPERIENCE AMONG INDUSTRIAL POLICY-HOLDERS

THE magnitude of the operations of the Metropolitan Life Insurance Company in the United States may be judged from the fact that the number, in round figures, of weekly premium-paying industrial policy-holders, which was already 8,000,000 in 1911, had mounted to 17,000,000 by 1935. An elaborate analysis has been made by L. I. Dublin and A. J. Lotka and their colleagues on the staff of the company's statistical bureau, of the mortality experience of these insured persons—working-class people, mostly town-dwellers—during 25 years.[1] Among the males, workers in the manufacturing and mechanical industries were heavily represented. Their age- and sex-constitution differed from that of the general population of the U.S.A.; data are available only for ages 1–74, and special methods of standardisation have had to be adopted. The methods of compilation and analysis of the data are described in an appendix, which should be studied by those who quote from the book, since there are peculiar difficulties in estimating the insured population at risk. As in all American vital statistics, separate statements of mortality for white and coloured (substantially negro) populations are given. The special value of this investigation depends on its compilation by one group of experts who have continuously scrutinised the day-to-day collection of data over a prolonged period, who are in a position to clear up doubtful death certificates by communication with medical practitioners, and whose survey embraces the whole 48 States.

The mean annual mortality in this group was at the rate of 9·2 per 1000, the standardised rate being 10·4. Between 1911–15 and 1931–35 the standardised rates for white males fell by 38·1 per cent., and for white females by 38·5 per cent. The reduction was greatest for both sexes in the 1–4 age-group and least and diminishing in age-groups over 45. The average duration of life (expectation of life at birth) has been extended by nearly 14 years, or approximately 30 per cent. The trends of mortality from groups of causes or separate causes are elaborately analysed in tables and charts throughout the text, and given in detail by age, sex, and colour in large tables appended. Here it is possible to mention only one or two points by way of illustration. Suicide followed with "uncanny exactness" the business index up to 1920, but since 1923 the parallelism was less apparent. Mortality from syphilis has fallen in whites but has risen in the coloured, probably as the result of more frequent diagnosis. As in other civilised countries cancer is an increasingly certified cause of death among males, but the standardised

[1] Twenty-five Years of Health Progress. A Study of the Mortality Experience among the Industrial Policy-holders of the Metropolitan Life Assurance Company, 1911 to 1935. By Louis I. Dublin, Ph.D., third vice-president and statistician, and Alfred J. Lotka, D.Sc., assistant statistician. New York: Metropolitan Life Insurance Company. 1937. Pp. 611.

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rate among white females is falling slightly. While cancer of the breast is a notable instance of an accessible site which shows a rise, part of it may be due to transference, by more accurate statement of primary lesions, from the group "stomach, liver, &c.," which shows a decided improvement especially in women. The effect of serum treatment of lobar pneumonia caused by certain types of pneumococcus is shown in a reduction of fatality by about one half. Gastric ulcer is up in men but down and steadily falling in women; duodenal ulcer, though much less frequent, is also rising in men. Appendicitis, which formerly had its highest rates in the teens, figures more heavily now at later ages; the rates for young children and in middle and old age have risen more than enough to counterbalance a fall at ages 10–35. Diabetes is increasing, especially among women, but insulin has saved the lives of many young children and has delayed death in adults. The reasons for these and other changes in mortality are fully discussed and practical suggestions are made for attacking each disease problem in such a way as to accelerate the striking improvement in the health of the people which is reflected particularly in the records of tuberculosis and the acute infectious diseases. The analysis is a valuable contribution to the study of vital statistics.

DOGS AS PARATYPHOID CARRIERS

IN the course of the Croydon typhoid inquiry, evidence was given to the effect that *Bacillus typhosus* may be found in human but not in animal excreta. Until recently paratyphoid fever had never been recognised in a dog, but a paper by Dr. J. Caspersen in the October number of *Norsk Magasin for Laegevidenskapen* suggests that despite the comparatively high concentration of hydrochloric acid in their stomachs (about double that in man) dogs may not only suffer severely from a paratyphoid B infection but may also convey it to man. A human outbreak of paratyphoid studied by Caspersen occurred last March in a Norwegian railway-station community of about 1000 souls, whose water-supply came from two main sources and whose milk-supply came from one and the same dairy. *B. paratyphosus* was found in the fæces of the 6 persons whose illness was clinically characteristic of paratyphoid, and also in the fæces of 3 other persons showing no clinical sign of the infection. As many as 6 of the 9 fæces-positive persons lived in the same house, and 4 of the 6 were ill. Agglutination tests and the cultural behaviour of the bacilli in question having confirmed the diagnosis of paratyphoid B, and the milk and water having been excluded as likely sources of the infection because so many of the cases were in a single house, a search was made for a carrier likely to be responsible for the outbreak. The search proving negative among human beings, the local medical officer of health, Dr. H. Walther, investigated the antecedents of an eighteen-month-old bitch belonging to the house in question. She had suddenly fallen ill between Feb. 10th and 15th with violent diarrhœa which had lasted about three days. She was ill altogether for about a fortnight and was for a week so feeble that her owner thought she must be paralysed. She aborted on Feb. 20th, and was apparently well again about March 1st—i.e., a couple of days before the beginning of the human outbreak. About six weeks after she had recovered her fæces were examined for *B. paratyphosus*, which was not found. But her serum agglutinated paratyphoid antigen in a dilution of 1/320 after two hours. As her O-agglutination was weaker (1/40), and as an infection with a member of the salmonella group might conceivably have been responsible for the agglutination of the paratyphoid antigen, salmonella agglutination tests were carried out, but proved negative. To strengthen his case, Caspersen examined the sera of 23 other dogs, and did not once obtain agglutination of these sera with a paratyphoid antigen. The massive and almost simultaneous infection of the occupants of the house in question therefore seem best accounted for in terms of a canine infection, although a few of the later human cases may possibly have represented secondary human infections. The implications of Caspersen's observations are of course limited by the differences in biological properties between typhoid and paratyphoid B bacilli.

SHORT-WAVE THERAPY IN TUBERCULOSIS

IT is clear that a heating effect may be produced by radio short-wave therapy, but different observers differ about the existence of any additional curative factor. The suggestion has been made that tuberculosis should be treated with radio short waves, and investigations are reported [1] in which the influence of these waves on tubercle bacilli in vitro and on the development of tuberculosis in guinea-pigs has been examined. First, suspensions of virulent and avirulent human tubercle bacilli of various concentrations were exposed in test-tubes, using wave-lengths ranging from 4·8 to 186 metres for periods of 5–30 minutes; but they took no harm thereby. Later a wave-length of 2·8 metres was used, at room temperature and at 37° C., over a continuous period of exposure of 30 days, but again there was no appreciable effect on viability. In the second series of experiments guinea-pigs were given intravenous injections of a virulent human strain of tubercle bacilli and were then divided into two groups, one being subjected to continuous short-wave treatment for 30 days while the other was kept as a control. An uninfected group of animals was subjected to the ray treatment alone. At the end of the 30 days necropsy showed that all the infected animals had a generalised moderate amount of tuberculosis, with no difference between the two groups. Irradiation by itself had caused no gross changes. The investigators believe that there is no conclusive evidence of a specific biological action of high-frequency currents, and that short-wave therapy has at present no justification in tuberculosis.

EXPERIMENTAL INTESTINAL DISTENSION

IT is difficult to devise experiments on the intestines of animals in which the results are not vitiated by the onset of peritonitis. This, moreover, tends to cause acute ileus, so that the terminal symptoms may be very similar whether death is directly attributed to intestinal obstruction or the operation has been complicated by peritonitis. Experiments to determine the part played by the nervous factor in intestinal obstruction involve inserting a foreign body into the intestinal lumen so that it can be artificially inflated. Ascroft and Lloyd Davies [2] have devised a method in which the loop of bowel to be inflated is severed from the main intestinal tube retaining its mesenteric connexions. Cats were used for the experiments. The isolated loop was transplanted beneath the skin of the abdominal wall, with each

[1] Corper, H. J., Cohn, M. L., Simpson, M. G., and Bower, C., *Amer. Rev. Tuberc.* December, 1937, p. 763.
[2] Ascroft, P. B., and Davies, O. V. Ll., *J. Physiol.* 1937, **91**, 16P.

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end open as a colostomy. The continuity of the bowel was restored and the animals allowed to recover from the operation. Thus the introduction of foreign bodies into the loop did not involve interference with the peritoneum. It was found that tight distension of the bowel wall caused none of the symptoms of shock or collapse associated with intestinal obstruction, despite the fact that the vascular and nervous connexions were intact. A piece of thin-walled rubber tubing was inserted into the lumen of the loop and inflated with water at a pressure varying from 135 to 210 mm. Hg. The distension was not released for from 3 to 18 days. The animals showed neither discomfort nor general symptoms. The contrast between the results of this and a previous set of experiments by Taylor, Weld, and Harrison [3] is interesting. They introduced a rubber bag attached to a firm rubber tube directly into the lumen of the normal bowel. The stout tubing preserved the lumen from complete obstruction while the bag was distended to a pressure of 60–110 mm. Hg. The dogs in which this was done became acutely ill and died within 24 hours with the symptoms of intestinal obstruction. It may, of course, be that the soiling of the peritoneum in Taylor's dogs complicated the issue. It seems more likely that the distension of the bowel wall, and the consequent interruption of peristalsis, may cause nervous or toxic disturbances in the gut wall which are not produced in an isolated loop. Taylor repeated his experiments on intestine that had been denervated. The animals lived longer, but they died of peritonitis.

PATHOGENESIS AND TREATMENT OF ANGINA

BEFORE 1924 myocardial infarction was hardly ever diagnosed clinically in this country; to-day, however, the error is probably in the other direction and it is diagnosed too often. There is still much that is obscure in the pathogenesis of anginal pain. Two interesting problems are the part played by coronary spasm, and the exact pathogenesis of severe anginal pains that have no apparent exciting cause, yet are not associated with evidence of infarction. In a discussion of angina apart from myocardial infarction, Hochrein [4] still characterises this pain as radiating down the left arm and as being associated with a sense of impending death, though both these features are absent in a large number of cases. Besides disagreeing with Anrep's experimental finding that with increase in systolic output there is a diminution in the coronary flow during systole, he seems to have misinterpreted Anrep's finding that in the innervated preparation the coronary flow per minute varies directly with the cardiac output. He discusses the part played by mechanical, chemical, hormonal, and nervous factors in the control of the coronary flow. Our knowledge of these factors derived from laboratory experiments cannot, however, be applied to the individual with angina for two reasons: first, the reactions of the arteries to the heart vary remarkably from one species to another; secondly, it has been shown that a diseased artery may react in the reverse way to a normal one.[5] Hochrein draws attention to the frequency of severe coronary disease in subjects who have never had cardiac pain, and it is generally agreed that the enormous variation in the sensitivity of the nervous system in different persons accounts in large part for this. In the differential diagnosis between angina and the type of chest pain met with in abnormal states of the nervous system, he believes that in the absence of organic heart disease the electrocardiogram is helpful. He says that immediately after exercise the anginal curve shows changes that are absent in the other type of pain. It is true that when an anginal subject takes exercise pain may arise and that this may be accompanied by temporary changes in the electrocardiogram, but the association is not constant enough to make a useful diagnostic test. The interrogation of the patient thus remains the most important step in the diagnosis of cardiac pain.

Turning to the treatment of angina, Hochrein condemns nitrites as the "morphia of the heart with all its disadvantages"—an unfortunate comparison, since morphine is one of the most valuable remedies in heart disease. It is contended that although nitrites may have a momentarily favourable effect they do ultimate harm, the attacks being rendered more frequent and severe. Unpleasant after-effects, such as mental numbness, giddiness, constipation, and cramps, are also held to be an important drawback. It is however surprising, if these drugs are of so little value in giving relief and so liable to produce unpleasant symptoms, that there should be any risk of the formation of a nitrite habit. Clinical experiments on the effect of nitrites in relieving effort angina have recently been reported by Riseman and Brown.[6] They induced attacks in their patients and determined the total duration of pain with the patient at rest but without medication. On a subsequent day the test was repeated, but a nitrite preparation was given at the onset of the pain. As would be expected, in patients whose pain usually passed off quickly with rest alone, the nitrite had little effect; in those liable to longer attacks the beneficial effect of the vasodilator was evident.

PREMATURELY AGED EX-SERVICE MEN

THE average age of ex-Service men is now 48, and each year an increasing number reach a time of life when they can no longer earn a living. The national insurance scheme assume that the average working man retires and needs his pension at 65, but the British Legion conference of 1936 suggested that the nervous strain and privations of war so affected those who served in it that, apart from actual disablement, they were likely to become unfit for work at an earlier age. A committee which the Legion set up to study this problem found that medical opinion was divided on whether soldiers were more likely to have been harmed by nervous strain or benefited by good food, fresh air, and regular exercise. Neither the approved societies nor the Ministry of Health were able to provide conclusive evidence, and it proved impracticable to make a medical survey of representative groups of ex-Service men and non-combatants. From a consideration of individual cases, however, the committee has no doubt that many men are prematurely old because of the intangible effects of the war. On the basis of figures supplied by local authorities it calculates that in the whole country there are about 18,000 ex-Service men between 40 and 60 who are chronically sick and compelled to apply for public assistance, and a further 25,000 under treatment at municipal hospitals. The Legion's own records show that an additional 50,000 are managing with difficulty to dispense with public assistance. Many ex-Service men regard help

[3] Taylor, N. B., Weld, C. B., and Harrison, G. K., *Canad. med. Ass. J.* 1933, 29, 227.
[4] Hochrein, M., *Med. Klinik*, 1937, 33, 1385.
[5] Anrep, G. V., Lane Medical Lectures, 1936, p. 94.
[6] Riseman, J. E. F., and Brown, M. G., *New Engl. J. Med.* 1937, 217, 470.

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from the "poor-law" as degrading and conveying a stigma of pauperism; they feel—and the committee supports them—that when they are in need and not catered for by a pension, by insurance, or otherwise, they should not have to apply for public assistance but should be a State charge.

THE NEW GUY'S

THE familiar quadrangle and façade of Guy's Hospital are threatened with demolition. The surgical block that lies behind them has been in existence with but little alteration since 1725, and the hospital authorities think it quite unsuited to modern requirements. The alternatives are to do away with all the remaining old buildings and erect an entirely new block, or to retain the façade and make new surgical wards behind it. The present entrance to the hospital has a quiet dignity and beauty that it would be difficult for a modern structure to emulate, and Guy's men feel that if it disappears something of the tradition that binds successive generations will go with it. If sentiment were the only consideration the second alternative would be the obvious choice, but a modern hospital, if it is to meet the increasing demands on its services, must put the claims of efficiency before those of architectural charm or even of tradition. The present surgical block covers an area of 250 by 150 feet and it is doubtful whether this will provide enough space for the present and future needs of the surgical wards unless the quadrangle is included. Moreover, defects in the walls and foundations of the chapel and the adjacent buildings may, it appears, already be imperilling their existence. The hospital architect, Mr. W. J. Walford, has drawn up a tentative plan for rebuilding which most but not all of the governors have approved. Fortunately, perhaps, the problem is not one that must be solved immediately, for the fulfilment of either scheme depends upon raising the necessary capital, some £500,000; and while this is being done some compromise may present itself that will be both surgically and æsthetically satisfying.

THE AGE OF LIBRARIES

ON Nov. 16th, 1936, the American Army Medical Library entered upon its second century of inestimable service to the medical and bibliographical world. Originating in a few works of reference for the private use of Surgeon-General Joseph Lovell, the collection grew under the care of its first great librarian, Colonel John Shaw Billings, slowly at first, then more rapidly into what is now the finest and most comprehensive medical library in the world, housing close on a million volumes and employing a staff of thirty. Since 1880, it has been responsible for the publication of the Surgeon-General's Index Catalogue in four series and, as a sort of monthly supplement, the invaluable "Index Medicus," now amalgamated with the Quarterly Cumulative Index.

A commemorative volume [1] has been issued in the form of a collection of articles reprinted from the *Military Surgeon* for January, 1937, and from the December, 1936, issue of *Medical Life*, bound together into one slim volume of some 130 pages. There is no introduction, nor is the pagination consecutive; and one's disappointment increases on finding that nearly all the articles are duplicated in the two sections. Among them are some charming ones, notably the report of Sir Humphry Rolleston's commemorative oration.[2] On the occasion of its delivery he was presented with a diploma appointing him consultant to the Army Medical Library. The history of medical book illustration from the twelfth to the twentieth century is outlined by C. F. Mayer, assistant librarian; and Major E. E. Hume, late librarian, describes the "Buildings for the Army Medical Library." The present librarian, Colonel H. W. Jones, gives accounts of the centenary celebrations and of the tributes received from some 200 institutions and distinguished men representing 45 different countries. Even if the commemorative volume is not entirely worthy of its subject, it will be valued for its historical account of one of the great treasures of the medical and bibliographical world.

[1] The One Hundredth Anniversary of the Army Medical Library. A symposium by various authors. Washington, D.C. Pp. 124.

[2] See also *Lancet*, 1936, 2, 1286.

EDUCATING OUR MASTERS

THE lack of confidence in doctors now displayed by the public is often deplored, but seldom so vigorously as by Dr. A. H. Douthwaite in his presidential address to the Harveian Society of London last week. Dr. Douthwaite had much to say about the follies of patients, especially rich ones, and regretted the "complete severance of the masses from logical thought." He did, however, end by admitting that the profession should be more ready to descend from its olympian heights. "We can't blame patients for disregarding our conventions if they don't know of their existence," and he had been credibly informed that the public as a whole has no idea that a general practitioner should be approached before going to a consultant. It may be asked, said Dr. Douthwaite, who is going to make himself responsible for the dissemination of medical truths. The campaign must in his opinion be in the hands of a body aloof from medical politics, and the General Medical Council would serve the purpose if it could obtain the necessary powers. (To enlist the sympathy of the public and the press has certainly not been the primary purpose of the council hitherto; whereas the British Medical Association has taken definite steps to do so.) On the whole, however, Dr. Douthwaite would prefer to see the task in the hands of younger men, and he hinted at the possibility of securing financial aid from bodies such as insurance companies which stand to lose from the self-treatment, or inefficient treatment, of disease.

THE 25 members of the General Nursing Council elected or appointed for the next five years include 4 members of the medical profession, Dr. M. A. Collins, Dr. Geoffrey Evans, Dr. M. H. Kettle, and Sir Frederick Menzies, all of whom are appointed by the Minister of Health.

INDEX TO "THE LANCET," VOL. II, 1937

THE Index and Title-page to Vol. II, 1937, which was completed with the issue of Dec. 25th, will be ready next week. A copy will be sent gratis to subscribers on receipt of a post card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

WESTMINSTER HOSPITAL.—A portion of the new Westminster Hospital now being erected on the St. John's Garden site is to be called the Coronation wing, and the King has consented that the first ward shall be named the King George VI ward, and the second the Queen Elizabeth ward. The wing will constitute a complete medical unit, with 25 beds, a clinical laboratory, and ancillary service rooms.

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SPECIAL ARTICLES

EARLY DIAGNOSIS AND PROGNOSIS OF LOBAR PNEUMONIA IN RELATION TO SERUM THERAPY*

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IF the therapeutic value of specific antiserum in the treatment of lobar pneumonia is admitted—and Cecil (1937) has pointed out that no paper has been published to contradict the many good reports on serum therapy—it may be asked why its use is not more general in this country. Some of the obstacles as outlined by Ryle and Waterfield (1933) are the delay in clinical and bacteriological diagnosis, the problem of deciding which patient really requires serum, since four out of five normally recover, and the difficulty and dangers of intravenous therapy. The last of these obstacles may usually be overcome by experience and adequate precautions so that there remain to be answered two questions: how to recognise *early* the case of pneumonia suitable for serum therapy and how to decide whether it is desirable to give serum to such a case. If we agree with Ryle that serum should be reserved for the patient who is likely to do badly, then to quote Davies, Hodgson, and Whitby (1935), "it would be a great gain in practical therapeutics if patients ... who need specific therapy to realize a crisis could be readily distinguished from those who come safely through without any specific measures." The purpose of the present paper is to describe the results obtained with two easily performed tests which help materially in the early diagnosis and prognosis of lobar pneumonia.

EARLIER METHODS FOR THE RAPID DETERMINATION OF PNEUMOCOCCUS TYPE

Several methods for the rapid determination of pneumococcus type in the sputum of patients with lobar pneumonia have from time to time been described (Krumwiede and Noble 1918, Avery 1918, Sabin 1929).

The first of these methods depends in essence on extracting the specific pneumococcus substance by boiling 5–10 ml. of sputum, breaking up the coagulum, adding a small amount of saline, centrifuging, and testing the clear supernatant fluid for precipitinogen by layering it on top of small amounts of the various type antisera in agglutination tubes. Results may be obtained in 15–30 minutes, but owing to the scantiness of sputum it is often impossible to carry out the test in the early stages of a pneumonia. Cecil and Plummer (1932) obtained positive results in 23 out of 28 patients, who in a series of 58 type II pneumococcal infections provided enough tenacious sputum to allow the test to be done.

In the same year, owing to the shortage of white mice at the time, Avery devised a test-tube method for rapid pneumococcus typing. A kernel of sputum, free of saliva, washed in saline and ground in a mortar is added to 4 ml. of glucose-blood-broth in a centrifuge tube and the mixture incubated for 5 hours. The broth is then lightly spun and the supernatant suspension of organisms is tested for agglutinability with types I, II, and III pneumococcus agglutinating sera or for the precipitation reaction after addition of bile to dissolve the pneumococci. In 60 cases Avery found agreement between the cultural and mouse inoculation methods in all save 3 type I infections where the sputum had not been washed free of mouth contaminants. This method could be usefully modified to-day to the rapid determination of pneumococcus type in the pneumonias of children.

The Sabin method requires the inoculation of sputum into a mouse from which peritoneal exudate is withdrawn some 4–6 hours later, a procedure first described by Avery in 1918. If pneumococci are numerously present, the exudate is tested for agglutinability by placing three drops on a slide and adding to the first drop a loopful of type I pneumococcus agglutinating antiserum, to the second type II and to the third type III antiserum. Agglutination may usually be seen naked-eye by a coarse granularity in one of the three mixtures or may be demonstrated microscopically by staining the dried preparation with dilute carbol-fuchsin. The peritoneal exudate is similarly examined when the mouse dies, usually 12–24 hours after inoculation.

The main disadvantage of Sabin's method is that it requires a licensed animal-house, a supply of suitable animals, and a licence-holder; but in spite of these drawbacks the mouse method of pneumococcus typing from sputum is, we believe, still the most reliable and should be used whenever possible as a confirmatory test to any other method.

PNEUMOCOCCUS TYPING BY THE DIRECT NEUFELD METHOD

The method which in recent years has attracted most attention is one which depends on a phenomenon first described by Neufeld in 1902. Neufeld observed that when a strongly acting antiserum was brought into contact with a broth culture of pneumococcus (one loopful of each on a cover-slip) there occurred swelling (*quellung*) of the individual cocci to two or three times their original size. "Sometimes it is clear that the linings of the bacterial cells take part in the swelling process. They change into a homogeneous, glassy mass while in the middle a dark round nucleus is to be seen." The swelling was seen only with undiluted serum: if the serum was used in a dilution of 1 : 4 or 1 : 8 agglutination only of the cocci occurred. Neufeld also remarked that the cocci in this swollen state seemed to have lost their staining capacity when dried and fixed in the ordinary way, but if stain were added to the wet preparation the central nucleus took up the dye while the swollen masses remained unstained. This phenomenon was being utilised in Neufeld's laboratory in 1930 for the serological typing of pneumococcus in experiments with animal carriers when it was demonstrated to one of us (R. C.) by Miss Etinger-Tulczynska, but although its use was suggested by Neufeld and Etinger-Tulczynska (1931) they had not tried it in cases of lobar pneumonia.

Armstrong (1931) was perhaps the first to apply the method to the identification of pneumococcus types from the sputa of patients with lobar pneumonia when he showed that with agglutinating rabbit sera the Neufeld phenomenon could be demonstrated with the peritoneal exudate of mice withdrawn a few hours after injection of the sputum. In the following year

* The work on which this paper is based was done in the pathology department of the Royal Infirmary, Glasgow, and we are especially indebted to Mr. J. L. Herrick for technical assistance. The material came from Belvidere Isolation Hospital, Glasgow, and we would thank Dr. T. Archibald, medical superintendent, for permission to utilise it, and Sister Murray for valuable assistance in collecting it.

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Armstrong (1932) and Logan and Smeall (1932) independently applied the Neufeld phenomenon to the immediate typing of pneumococcus from sputum. The latter workers stressed the possible fallacies of the method in the hands of an inexperienced microscopist—e.g., mistaking yeasts or starch granules for swollen pneumococci or confusing a type III pneumococcus in its normal state with a swollen type I or II organism. Since then, this method has been adopted enthusiastically in America where various workers have reported the results obtained with or without modifications in the original technique. Sabin (1933), for example, stated that agglutinating *rabbit* sera should be used since sera prepared from the *horse* sometimes gave non-specific reactions, that the sputum should be typed not later than 1–2 hours after being coughed up, and that alkaline methylene-blue, as used in Neufeld's laboratory, should be added to demarcate the pneumococcus cell. Most workers (e.g., Neufeld and Etinger-Tulczynska 1931, Bullowa 1935, Park 1935) seem to agree on the advisability of using rabbit rather than horse agglutinating sera. Beckler and MacLeod (1934) extended the Neufeld method of pneumococcus typing, previously used only for types I, II, and III, to the determination of Cooper's other 29 specific types of pneumococcus. Their results for types I, II, and III show a remarkable accuracy and a high proportion of positive reports when compared with the mouse and other methods of typing: of 246 sputa 135 were diagnosed type I by the Neufeld technique and 94 per cent. of these were corroborated by other methods; 29 were similarly diagnosed type II and all were checked; while 98 per cent. of 82 specimens diagnosed type III were corroborated. They were able to give to the physician an immediate correct report on 89 per cent. of all types I and II cases of pneumococcal pneumonia from which sputum was sent for examination. Bullowa reported 76 per cent. positive results by the Neufeld method in 100 consecutive cases and remarked on the possibility of typing from old specimens of sputum. Vinograd, Nemir, and Park (1936) applied the method to children, again with all of Cooper's 32 types, by washing in broth a swab from the back of the throat, centrifuging, and mixing a loopful of the deposit with the agglutinating sera: 76 positive Neufeld typings were confirmed by mouse inoculation; 7 positive Neufeld results were not confirmed from the mouse; while 6 positive mouse results were negative by the Neufeld technique.

Thus the American work has shown that the Neufeld method gives 75–90 per cent. correct reports in pneumonias due to all types of the pneumococcus.

METHODS AND MATERIAL IN THE PRESENT INVESTIGATION

Specimens of sputum were collected from male patients suffering from lobar pneumonia, usually on the first or second day after admission to hospital. The average duration of illness of these patients on admission was 3·6 days. In certain cases specimens were examined from patients after the critical fall of temperature, and there were a few specimens from patients with broncho-pneumonia and bronchitis, although as a rule frankly purulent sputa were not examined. In every case the specimen used for immediate typing was injected into a mouse and serological typing carried out 6 hours afterwards by withdrawal of peritoneal exudate or after death of the mouse. It was the rule to have several specimens for mouse-typing from each patient during the course of his illness so that the initial type-determination could be corroborated.

The sera used were the agglutinating antisera supplied by Burroughs Wellcome and Co. for types I and II pneumococci, and a similar serum supplied by Mulford (Sharp and Dohme) for type III pneumococcus. These sera were prepared in the *horse*, and when mixed on a slide in dilutions of 1 : 10 and sometimes 1 : 20 with mouse peritoneal exudate immediately agglutinated the homologous pneumococcus. The titres of the types I and II sera when tested macroscopically in the water bath at 55° C. against suspensions of pneumococci varied from 1 : 64–1 : 128, and our experience that good titre horse sera give reliable Neufeld readings has been confirmed by Whitby (1937).

For the test proper these sera were diluted 1 in 5 and several loopfuls of type I antiserum were intimately mixed at one end of the slide with a loopful of sputum (amounting in actual volume to approximately twice that of the added serum); at the other end the same procedure was carried out with a type II antiserum: cover-slips were placed on top and ringed with Vaseline and the preparations were examined under the oil-immersion lens with the light dimmed. If no immediate diagnosis could be given, the specimens were left and re-examined after 10–15 minutes or as late as half an hour.

The characteristic *quellung* has now been frequently described: the striking features are the "ballooned" appearance of the diplococcus, the apparently swollen capsule being rather opaque, greenish-grey in colour, and much more definite in outline than the scarcely distinguishable translucent capsule of the unaffected organism. There is no doubt that a certain amount of experience and often a considerable degree of patience are required for a high proportion of successes, particularly if the organisms are scantily present. We did not as a rule add any stain, although for demonstration purposes the addition of a drop of alkaline methylene-blue helps to locate the pneumococci, while for a permanent preparation Valentine's (1933) method or the modification suggested by Clark (1933) gives good results.

Contrary to Sabin's experience, freshness of the specimen is not essential: for example, positive results were obtained with specimens of sputum kept on the bench for 5–6 days even after the organisms were apparently dead as tested by mouse inoculation of the sputum. The main cause of failure in immediate Neufeld typing is the paucity of the specific pneumococcus, more particularly if other organisms are numerously present. May we say here that every effort should be made to obtain adequate specimens of sputum by propping up the patient and encouraging him to cough up material from the bronchi; attempts to collect sputum from a patient in the recumbent position, particularly in the early stages when exudate is scanty, usually result in a purely salivary specimen.

TABLE SHOWING DIRECT (NEUFELD) PNEUMOCOCCUS TYPING FROM SPUTUM

189 specimens: "direct" and "mouse" typing agreed in 151=80 per cent.

	Mouse.	Direct.	Per cent. agreement.
Type I ..	29	23	79·3
" II ..	77	60	77·9
" III ..	5	2	—
Group IV ..	78	66	84·6
Types I & II ..	102 (corrected)	83	*81·3*

RESULTS OF NEUFELD TYPING

The uncorrected results are shown in the accompanying Table, where it will be noted that of 189 specimens of sputum examined there was agreement

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between the mouse and direct typing in 151, or 80 per cent. There were 23 failures of immediate typing out of 106 sputa containing types I and II pneumococci as determined by the mouse method, and when these were analysed it was found that 3 of the specimens were from convalescent patients while a fourth was the last specimen of sputum from a patient with group IV pneumococcus pneumonia. All the others except 3 were specimens taken on the day after admission, so that failure to identify the type I or II pneumococcus by the direct method was most probably due to scantiness of the pneumococci. If the 4 specimens from convalescent patients are omitted, the proportion of correct diagnoses by the Neufeld method in types I and II pneumococcal pneumonias is 83 out of 102, or 81·3 per cent. In other words, if all these patients had been considered suitable for serum therapy, specific treatment would have been deferred for 6–18 hours in only one-fifth of the cases until a type diagnosis was obtained by the mouse method.

More disturbing at first sight were the 12 specimens from which group IV pneumococci were recovered by mouse-inoculation, whereas the presence of type I, II, or III was diagnosed or suspected by the direct method of examination. Occasional discrepancies in this direction between the direct and mouse methods of typing may be expected, since type I or II pneumococci scantily present in a sputum containing numerous group IV organisms may be detected by the Neufeld technique but overwhelmed in the mouse peritoneal cavity. Most workers have had experience of two or more pneumococcal types being present in a sputum simultaneously. Analysis of the present series showed that the results were not as bad as they looked. For example, one of five patients in whose sputa type I pneumococci were recorded by the Neufeld test proved, by subsequent examination and by a dramatic response to serum treatment, to be a type I infection; another from whom only one specimen of sputum was obtained might also from the clinical history have been a type I pneumococcal pneumonia. In two patients the diagnosis from direct typing was type II pneumococcus and this type diagnosis was confirmed in one by direct and mouse examination of a second specimen of sputum. Of the remaining five, two were reported "? type I," one as "? type II," and two as "? type III" by the Neufeld method, but these types were not recovered by mouse-inoculation. Thus discounting the query diagnoses and the two cases which later proved to be due to the type suggested by the Neufeld method, there remained 5 patients out of 78, or 6·4 per cent., who, if serum were being exhibited on the results of the direct examination, would have been wastefully given at least one dose of antipneumococcal serum. On the other hand, serum would have been wrongly withheld in two cases for 2–3 days had the mouse method alone been relied on for type diagnosis.

URINARY PRECIPITATION TEST

In 1917 Dochez and Avery reported the excretion of a specific substance in the urine of patients with types I, II, and III lobar pneumonia, and one of us has lately published the first corroborative findings (Cruickshank 1938). It is our intention here to assess the value which the demonstration of these specific substances has in the early diagnosis and prognosis of lobar pneumonia. Now known to be polysaccharides which are intimately associated with the pneumococcus capsule, they are readily detected by a precipitation reaction between the urine and the type-specific pneumococcal antisera.

Phosphates are first deposited by adding 4–5 drops of N/1 NaOH to 5 ml. of urine in a centrifuge tube and spinning until the supernatant fluid is clear. On top of 0·3 ml. of this urine in each of three Dreyer's agglutination tubes is layered 0·2 ml. of a 1 in 5 dilution of type I antipneumococcal serum (to the first tube), 0·2 ml. of type II antiserum (to the second tube), and 0·2 ml. of type III antiserum (to the third tube). The tubes are immediately examined in a good light for a white ring at the junction of the fluids and re-examined for a deposit after standing on the bench for four hours, the amount of deposit being recorded as +, ++, or +++.

In the examination of over a thousand specimens from 200 patients the test has proved to be absolutely specific.

Diagnosis.—Although 96 out of 154 patients, or 62·3 per cent., suffering from type I, II, or III pneumococcal pneumonia had demonstrable specific substance in their urine at some stage of infection or convalescence, the test was positive in the first specimen, taken on the morning after admission, of only 64 patients, or 41·5 per cent.—viz., in 9 out of 44 type I pneumococcal pneumonias, in 53 out of 103 type II infections, and in 2 out of 5 type III cases. Thus only a fifth of the type I and half of the type II pneumonias could, on admission to hospital, be serologically typed by this method. The test is therefore not to be relied upon as a method for early diagnosis, but is rather a useful confirmatory test especially in type II infections. It may also on occasion identify the infecting pneumococcus type when other methods fail. A few examples may be cited.

A patient, aged 24, died 5 days after admission: sputum could not be obtained but urinary specimens on the second, third, and fifth days after admission gave respectively ++, ++, and +++ precipitates with type II pneumococcus antiserum. Autopsy was refused but a post-mortem lung-puncture gave a culture of type II pneumococcus.

Another patient, aged 40, died on his third day in hospital: on the morning of his death a meagre specimen of sputum was obtained from which a ? type II pneumococcus was isolated by mouse-inoculation. A urinary specimen on the previous day gave a strongly positive type II precipitation reaction.

From the sputum of a third patient, aged 45, whose temperature was settling on admission, type I pneumococcus was repeatedly isolated. The patient had pulmonary phthisis and it was thought that the signs in the lung were due to the tuberculous infection and not to a resolving pneumonia. However, his urine on the first, third, and fifth days after admission gave +++, +++, and + precipitates with type I antiserum, and the diagnosis was altered from tuberculous broncho-pneumonia to resolving lobar pneumonia and pulmonary phthisis.

The test has also confirmed the clinical diagnosis of reinfections occurring in the wards. For example, two patients with lobar pneumonia had group IV pneumococci in their sputa for two weeks; then type II pneumococcus appeared coincident with a rise of temperature. The occurrence of type II pneumococcus in the sputum of a convalescent patient in the pneumonia ward might have been due to a temporary carrier state, but the urinary specimens which for two weeks had given negative reactions with types I, II, and III pneumococcus antisera now gave precipitates with the type II serum. Pleural fluids and other exudates suspected of being pneumococcal have also been tested for specific

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polysaccharide by this method and a diagnosis of type has sometimes been given when the causal organism could not be recovered from the fluid.

The *prognosis* of lobar pneumonia is difficult. The factors to which we have learnt to attach importance in an otherwise healthy individual are the age of the patient, the serological type of the infecting pneumococcus, the leucocyte response, and the presence or absence of bacteræmia. Blood culture may be discounted since it requires special laboratory facilities and the lapse of 24 hours before the result is known; besides, a single blood culture early in the infection is a much less reliable prognostic guide than a leucocyte count (Cruickshank 1933, Davies and others 1935). A single leucocyte count may also be misleading: an initial low count may rise as the disease progresses and vice versa. Knowledge of the infecting type in lobar pneumonia is possibly of more prognostic value than to know that a case of enterica is due to the typhoid or paratyphoid bacillus or that the Flexner or Shiga organism is the cause of a particular case of dysentery, since at all ages the mortality from type II infection is greater than that in type I pneumonia (Cruickshank 1933). And, of course, increasing age has long been known to affect the mortality-rate of lobar pneumonia. But in spite of this knowledge, the physician is often unable to say how a particular patient with lobar pneumonia is likely to progress, or, knowing that the infecting organism is type I or II pneumococcus, to decide whether or not to give the patient serum. The urinary precipitation test should help him to make up his mind. If only the admission specimen of urine in cases with types I and II pneumococcal pneumonia is considered, there were in our series 62 patients with positive reactions of whom 24 died (= 38·7 per cent.), while 85 patients had negative initial tests of whom 2 died (= 2·3 per cent.). Of the latter two patients, A. B., aged 18, type I, had increasingly positive specimens on the third, fifth, and seventh days and died on his eighth day in hospital. From the other patient, C. D., aged 36, type II, only one specimen of urine was obtained and it gave a doubtful positive reaction.

If all the specimens tested are considered, the reaction was positive in 94 patients of whom 25, or 26·6 per cent., died and negative in 53 patients of whom only 1, or 1·9 per cent., died. The case death-rate was 17·6 per cent. Thus it seems fair to state that a positive reaction with the first specimen of urine in a case of lobar pneumonia due to type I or II pneumococcus justifies a grave prognosis since two-fifths of such patients die, whereas a negative test, and more especially if it continues negative, calls for a very reassuring report. The outlook is especially grave if the first specimen gives a "3 plus" precipitate. As for serum therapy, we suggest that unless there are definite contra-indications every patient whose first urinary specimen contains demonstrable specific pneumococcus polysaccharide should have the benefit of serum. If the precipitation test is negative, there is no indication for giving serum to save life, although it may at the physician's discretion be used to abort the infection. The dosage of serum could probably be graded in accordance with the result of the test: small doses would suffice if the test were negative and larger doses should be given according to the amount of precipitate in a positive reaction.

It must occasionally happen that a patient with lobar pneumonia dies from other causes than the pneumococcal infection; but the fact that in our series only 1 patient died—and he with a "? positive" reaction—out of 53 whose urinary precipitation tests were persistently negative, indicates that the pneumococcal toxæmia is almost always an important contributory factor in a fatal termination. In saying this, we make what seems a justifiable assumption that the excretion of the pneumococcus polysaccharide in the urine is an indication of the severity of the pneumococcal toxæmia. This assumption is supported by the finding of a greater incidence of positive urinary precipitation tests among patients over 35 years compared with those under 35, and in type II compared with type I pneumococcal infections, a finding which is correlated with a higher case-fatality in these groups (Cruickshank 1938). A close relationship between precipitation reaction and severity of infection has been recently demonstrated in another disease—viz., cerebro-spinal fever in which the test has been used diagnostically for some time. Alexander (1937) has shown that if the cerebro-spinal fluid, after centrifugation, is layered on top of the type-specific sera, appearance of the precipitation ring *within 10 minutes* indicates a grave prognosis, since among 69 patients 77 per cent. died in which this happened and only 4 per cent. where the test was negative.

SUMMARY

For the proper and effective treatment of lobar pneumonia with type-specific antisera, the physician must know the infecting pneumococcus type and assess the severity of the infection as early as possible. By the Neufeld method of direct pneumococcus typing, American workers using agglutinating *rabbit* sera have had 75–90 per cent. successes not only with types I and II pneumococci but also with other types for which therapeutic sera are now available. In the present investigation, with agglutinating *horse* sera, the type diagnosis has been made by the Neufeld method in over 80 per cent. of 102 patients with type I or II pneumococcal pneumonia. Although the infecting type has occasionally been identified by direct typing and missed by the mouse-inoculation method, the latter procedure should wherever possible be used to corroborate and check type diagnosis by the Neufeld technique.

The prognosis of lobar pneumonia is difficult and in deciding whether a patient requires specific serum therapy, the physician has usually taken into consideration a combination of such factors as age of patient, infecting pneumococcus type, leucocyte count, and blood culture, although no one of these factors is by itself a reliable guide. The presence of the specific pneumococcus polysaccharide in the urine—readily demonstrable by a precipitation reaction—during the early stages of infection is recommended as a valuable prognostic criterion. Of 62 patients who on admission gave a positive urinary precipitation test 24 died, or 38·7 per cent., whereas out of 53 patients with persistently negative tests only 1 died, or 1·9 per cent. It is therefore suggested that in the absence of definite contra-indications, a patient with lobar pneumonia whose early urinary specimens contain pneumococcus polysaccharide is a suitable case for serum therapy.

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STANDARDISATION OF PRECORDIAL LEADS

JOINT RECOMMENDATIONS OF THE CARDIAC SOCIETY OF GREAT BRITAIN AND IRELAND AND THE AMERICAN HEART ASSOCIATION

IN the last few years electrocardiographic leads in which an electrode placed upon the precordia is paired with an electrode in contact with some part of the body distant from the heart have come into widespread use. The confusion which has resulted from the lack of uniformity and precision in the technique and nomenclature employed by different observers in connexion with leads of this kind has led to an almost universal desire that a standard practice be established. To this end the Cardiac Society of Great Britain and Ireland and the American Heart Association have each appointed a committee to consider this matter and make recommendations. The two committees have conferred and have agreed jointly to make recommendations with reference to the routine use of a single precordial lead. It is understood that either committee may make additional reports with reference to multiple precordial leads and other matters not dealt with in the present report.

THE PROPOSALS

1. It is recommended that those who employ a single precordial lead place the precordial electrode upon the extreme outer border of the apex-beat, as determined by palpation. If the apex-beat cannot be located satisfactorily by palpation the electrode may be placed in the fifth intercostal space just outside the left border of cardiac dullness, or just outside the left midclavicular line if percussion of the heart is unsatisfactory. Where precordial leads are taken by a technical assistant, the position for the precordial electrode should be marked on the chest by the physician.

2. It is recommended that a single precordial lead in which the precordial electrode has the location specified in the preceding paragraph be known as lead IV when this electrode is paired with an electrode in the left interscapular region; lead IV R when it is paired with an electrode on the right arm; lead IV L when it is paired with an electrode on the left arm; lead IV F when it is paired with an electrode on the left leg; and lead IV T when it is paired with a central terminal connected through equal resistances of 5000 or more ohms to electrodes on each of the three extremities mentioned.

It is suggested that *for all ordinary purposes lead IV R or lead IV F should be employed.* The latter lead should have the preference until it has been established that the former, which is somewhat more convenient, is equivalent to the latter for all practical purposes, or yields results of equal value.

3. It is recommended that in taking the precordial leads specified the galvanometer connexions be made in such a way that relative positivity of the apical electrode is represented in the finished curve by an upward deflection (a deflection above the isopotential level) and relative negativity of the apical electrode by a downward deflection.

It is urged that this convention be adhered to in the case of precordial leads other than those specified, and also in the case of all leads in which one electrode is placed much closer to the heart than the other. In other words, it shall be the standard convention in taking such leads to make the galvanometer connexions in such a way that relative positivity of the electrode nearer the heart is represented by an upward deflection.

4. It is recommended that with the galvanometer connexions made as described in the preceding paragraph, the deflections of precordial leads be designated by the symbols P, Q, R, S, and T, and that in the application of these symbols the same conventions be employed as in the case of the standard limb leads.

5. It is recommended that in taking precordial leads the electrocardiograph be so adjusted that a deflection of 1 cm. in the finished record corresponds to a potential difference of one millivolt as in the case of the standard limb leads. Any reduction in sensitivity made necessary by very large deflections should be clearly indicated on the curve preferably by photographing the effect of introducing a potential difference of 1 mv. into the galvanometer circuit.

6. It is recommended that the greatest dimension of the apical electrode employed in taking the leads specified in this report be 3 cm. or less. A circular electrode between 2 cm. and 3 cm. in diameter should ordinarily be employed.

7. It is recommended that the terms lead IV (R, F, &c.), apical lead, apex-leg lead, &c., be used henceforth only in connexion with the leads specified in this report.

THE TWO COMMITTEES

The above recommendations have been drawn up by the following two committees, working in coöperation:—

Committee of the Cardiac Society of Great Britain and Ireland.—D. Evan Bedford, John Parkinson, and P. H. Wood (London); John Cowan (Glasgow); A. N. Drury (Cambridge); and I. G. W. Hill (Edinburgh).

Committee of the American Heart Association.—Arlie R. Barnes (Rochester); Harold E. B. Pardee (New York); Paul D. White (Boston); Frank N. Wilson (Ann Arbor); and Charles C. Wolferth (Philadelphia).

The joint recommendations have been approved by the council of the Cardiac Society and by the American Heart Association, who now authorise their publication. The following addendum to the joint report has been made by the Cardiac Society.

ADDENDUM

1. The above report deals with the nomenclature and technique for obtaining a single precordial lead suitable for routine clinical work. The subcommittee of the Cardiac Society had insufficient evidence available to permit their making recommendations in respect of multiple precordial leads. The American Heart Association will, however, draw up such recommendations, and, when published, copies of these

(*References continued from previous page*)

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will be available for those specially interested, on application to the secretary of the Cardiac Society.

2. In using either of the two standard precordial leads (e.g., lead IV R or lead IV F) the correct polarity (paragraph 3) is obtained as follows.

The lead switch is turned to lead I. The L.A. terminal is connected to the precordial electrode. The R.A. terminal is connected to the distant electrode—e.g., to the right arm for lead IV R, or to the left leg for lead IV F.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

VOLUNTARY HOSPITALS

THE work done by voluntary hospitals in Scotland continues to increase steadily. It has been lately pointed out, for example, that the annual expenditure at the Glasgow Royal Infirmary was £10,000 greater than the previous year. Glasgow Western Infirmary has treated more patients during the year than ever before in its history. It has also installed a radium beam apparatus of the most modern type, the first of its kind in the west of Scotland. The work at the Edinburgh Royal Infirmary is also to extend and the ordinary expenditure during the past year was £177,000. The cost of building the new maternity hospital and nurses' home is still causing the managers anxiety, for £120,000 is still required.

At recent meetings in connexion with voluntary hospitals, reference has repeatedly been made to the high standard of the work done and, while any attempt to compare the municipal hospitals with voluntary hospitals has naturally been discouraged, the fact remains that the voluntary hospitals in Scotland are still the most up to date in the country. The standard of their management is also very high, from the point of view both of the patient and of the medical staff.

PAYMENT OF MEDICAL STAFF

With the increase in the amount of work done by the voluntary hospital it is natural that the question of remunerating the medical staff should be considered to an increasing extent. The amount of time they give to the hospital work is steadily growing, and there is a general feeling that payment should be made for these services. A definite step in this direction has been made by the Royal Hospital for Sick Children in Glasgow, for it was announced recently that "the directors of the hospital are satisfied that the time has come when they must ask the public to support them in recognising financially in a reasonable manner the great services rendered to them by the members of the medical profession on the staff." It was pointed out that the rate-aided hospitals paid their medical and surgical staffs, and that the time had now come for the voluntary hospitals to follow suit.

Glasgow hospitals are also playing a leading part in Scotland in providing beds for paying patients. A new auxiliary hospital of the Royal Infirmary has just been opened and contains 66 beds for paying patients. It has been built on the outskirts of the city, and the treatment of the patients will be in the hands of the staff of the nearest hospital. The fees payable to those in charge of the case, which will be on the modified scale, are to be a matter of personal arrangement between the patient and the physician or surgeon concerned. The charges for maintenance and nursing will be 3 guineas a week for accommodation in a four-bed ward; 4 guineas for one with two beds; and 5 guineas for a single room.

The Royal Infirmary has also opened a new convalescent home which will provide accommodation for 80 patients.

VIENNA

(FROM OUR OWN CORRESPONDENT)

DIABETICS WITH CORONARY THROMBOSIS

A VERY interesting debate on the problems connected with the insulin treatment of diabetics suffering from coronary disease was introduced at a recent meeting of the Vienna Gesellschaft der Aerzte by Dr. E. Hammerschlag, who demonstrated charts and electrocardiograms of several patients suffering from these two conditions. As he pointed out there is a great diversity of opinion among the leading specialists on the best course in this combination of diseases. While some eminent men believe that to combat the diabetes by giving insulin and the proper amount of carbohydrates comes first, others dread the larger doses of insulin and believe that it is just this prolonged treatment with insulin that precipitates or predisposes them to attacks of coronary disease. Prof. Singer, supporting this view, remarked on the serious increase of stenocardial attacks and lesions of the myocardium lately observed in diabetics treated with insulin, which is supported by evidence from post-mortems. While Dr. Hammerschlag advises the use of slow-acting protamine-zinc-insulin, others prefer to continue the dietetic treatment as long as possible. Nearly all leading specialists of the Vienna school took part in the discussion that followed. Thus Prof. Falta, on his experience of over 2000 cases since 1924, of which over 75 per cent. had received more or less prolonged insulin treatment, is not convinced that this precipitates attacks of angina pectoris. Even in cases with grave coma, requiring massive doses of insulin on the first day, he has never observed important changes in the electrocardiogram. Others quoted the work of Max Rosenberg of Berlin, on 2500 diabetics treated with insulin, who also did not see a fatal attack of stenocardia traceable to this therapy—American physicians go so far as to believe that insulin favourably affects cardiac disease in diabetics, provided that hypoglycæmic shock is carefully avoided. Other observers lay stress on cautious dosage, and it is also important to be very careful in the prescribing of a strict diet in diabetics even without insulin, for this itself may precipitate an attack of cardiac pain. Schur believes that the rapid lowering of the blood-sugar is responsible. He laid stress on the need for abstaining from large doses of insulin, especially in the evening. Prof. Scherf believes that insulin is advisable in diabetics with coronary disease either if there is coma, actual or threatening, or if a change in the diet is necessary. It is not the quantity that matters, but the tolerance of the individual. In some cases he observed even small doses to be harmful.

THE NEW LAW ON NOTIFICATION

A new regulation, valid from the end of 1937, has been published by the Ministry of Health regulating the notification of certain easily transmissible diseases. The conditions are divided into two groups—absolutely notifiable and relatively notifiable. The first group makes a list very similar to that in England. Anyone having or suspected of having one of these diseases, as well as every death that might be due to

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them, must be notified at once by the medical attendant to the local medical officer of health. The second group need be notified only when occurring in such places as schools, spas, prisons, and health resorts, or in epidemics or when a community is threatened, as in open tuberculosis. Though the medical attendant is bound, by law, to send in his notifications he cannot expect any remuneration. The local medical organisation, however, may obtain a grant from the local authorities in recognition of the work done for public health by its members.

DEATH OF PROF. KREN

Prof. Otto Kren, chief of the dermatological department of the Municipal General Hospital, has just died at the age of 61 after a short illness. Dr. Kren was a native of Vienna, and obtained his degree at the university. He first studied pathological anatomy under Weichselbaum, and surgery under Eiselsberg, but soon turned to dermatology. He was appointed first assistant to Prof. Riehl, remaining with him for many years. Here he worked chiefly on the dermatoses of the oral mucosa, and on the tuberculous lesions of the skin. In 1912 he accepted an invitation to the dermatological department of the municipal hospital, which became well known under him for its treatment of eczema. He was a splendid diagnostician and therapeutist. He was also very active in the organisation of the Vienna specialists, leading them just when they had to wage a very strenuous fight against elements striving to make civil servants of medical men. He was successful in obtaining for them a "higher standard of fees and protection of their status."

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

COMPULSORY BLOOD TEST IN PREGNANCY

LAST night the *New York Post* published a front-page editorial entitled 13,000 Babies. This estimate comprises 4000 babies born annually with congenital syphilis and 9000 stillbirths attributable to the same disease. It is the optimistic sense of this editorial that congenital syphilis can be wiped out by requiring a serological test of every pregnant woman. The *Post* has found by a questionnaire that half the obstetricians consulted "will not suggest such a test for fear that their patients will become annoyed and snippy at the very idea." If the test were made compulsory the doctor would be protected from the displeasure of his patients!

As a matter of fact a Bill has already been drawn and will undoubtedly have been introduced into the New York legislature by the time this letter reaches England. It has already been promised support of so influential a character that it is quite likely to be enacted. The Bill requires that a test be made either during pregnancy or at the time of delivery. In case no test is made the doctor must file a statement in the birth certificate explaining his reasons for the omission. Serious students do not anticipate that this legislation will cause any startling decrease in the incidence of congenital syphilis, but they do believe that serological tests in pregnancy will become more numerous and that important information will be collected.

Another Bill which will be introduced very shortly requires a medical statement before the issue of each marriage licence to the effect that the applicants are free from syphilis or that it is not in a communicable stage. A serological test is obligatory and the report on its result will be filed with the department of health. This legislation follows closely the law of Connecticut which has operated successfully for the last two years. Some discussion has taken place as to the type of medical examination that shall be demanded and the Bill will probably be found to require an examination adequate to disclose any of the protean manifestations of syphilis but not disguised to uncover every communicable disease.

OUTBREAK OF BOTULISM

An unusually severe outbreak of botulism is reported from Tucumcari, N.M., by Dr. C. H. Douthirt of the State health department. Twenty-four persons ate lunch together in the home of the late J. Gallegos, whose funeral they had come to attend. All but 4 of these partook of a salad containing home-canned chili. Of the remainder 9 died and 3 were seriously ill at the time the report was made. The 8 others were given prophylactic doses of antitoxin and either because of this or because they were mistaken about eating the chili 6 had no symptoms of botulism, while the 2 who showed symptoms quickly recovered on receiving further doses of antitoxin. *Bacillus botulinus* type A was found by two different laboratories in samples of the suspected chili.

"Almost invariably," writes Dr. Douthirt, "the very first symptoms were inability to see objects more than three or four feet away, dizziness, and double vision. One or two complained of having pain in the abdomen and probably two of the entire series vomited . . . the next complaint was a feeling of heaviness of the tongue, which was usually heavily coated and seemed to be thickened, causing difficulty in enunciation. The next symptom in order was a tightness in the throat. This was followed by difficulty in swallowing and inability to swallow." Symptoms began in almost exactly eighteen hours in cases where a normal amount of salad had been consumed. In addition to those already mentioned a characteristic symptom was general restlessness increasing during the illness. The mentality remained unclouded and hearing acute. One patient answered questions by writing the answers until just before she died; others by nodding their heads or making movements after they had lost the power of speech. Physicians observed ptosis. Pupils were dilated but reacted to light until near the end. Temperature was subnormal; the pulse was at first slow and regular, later becoming irregular and faster. A peculiar pallor was observed. Death in every case resulted from respiratory paralysis.

Dr. Douthirt notes that one mother fatally stricken was allowed to nurse her baby without any apparent ill effect upon the child.

A PSYCHIATRIC RESEARCH BUREAU

THANKS to the generous coöperation of the Rockefeller Foundation a bureau for the assistance of research workers in psychiatry has been established under the auspices of the Royal Medico-Psychological Association. The objects of the bureau are as follows:—

1. Any psychiatrist who wishes for special information as to what is at present known on any subject

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of interest to himself is invited to notify the secretary of the bureau. A bibliography of all recent papers relating to the subject will be sent to him together with abstracts of such communications as may seem of great importance, and should he then desire abstracts of any particular papers, especially those published in foreign languages, they will be made for him on demand.

2. Any worker who wishes to start some particular research may on application obtain information as to what has already been done on the subject, and what methods of procedure are advised for further work.

3. Any worker who desires further elucidation on points of technique will be either advised directly from the bureau or put into direct communication with the appropriate members of a panel of experts who have kindly consented to advise on technical questions.

4. Workers desiring the loan of technical manuals for purposes of their work may obtain them on application.

5. Workers desiring to see personally the application of methods of research or treatment, or to confer personally with expert advisers, will be eligible to receive small grants to enable them to do so. These grants, which will be made by the committee, are intended to cover the expense of visits of a few days to laboratories at home or abroad, and are primarily for the use of medical officers who might be unable to make such visits at their own expense.

6. A short account of recent advances in subjects of particular interest, together with a fairly complete bibliography, will be issued at intervals and sent to any psychiatrist who may signify a desire to receive it.

7. Psychiatrists who would like to be put into communication with other workers abroad can receive help from the bureau.

Although it is hoped that all British psychiatrists will be members of the association, the services of the bureau and the grants will be available to any psychiatrist working in the British Empire. The members of the committee are Sir Hubert Bond, Dr. John Brander, Dr. W. T. Fleming, Prof. F. L. Golla, Dr. P. K. McCowan, Dr. W. D. Nicol, Dr. G. W. Smith, and Dr. R. M. Stewart, and communications should be addressed to the Research Bureau, Royal Medico-Psychological Association, 11, Chandos-street, London, W.1.

MEDICINE AND THE LAW

Private Car Used as Ambulance

SPEED limits do not apply to a private car when used as an ambulance. A decision to this effect was made by the Wells city magistrates last week, and, though lay magistrates are not always divinely inspired in their interpretation of the law, there seems no doubt that on this occasion they were right. Section 3 of the Road Traffic Act, 1934, enacts that provisions imposing speed limits "shall not apply to any vehicle on an occasion when it is being used for fire brigade, ambulance or police purposes, if the observance of those provisions would be likely to hinder the use of the vehicle for the purpose for which it is being used on that occasion."

In the Wells case a Glastonbury merchant was performing an errand of mercy by taking a man with a fractured ankle from Glastonbury to Wells. While he was travelling rather fast through a restricted area, he was ordered by a police car to stop. He shouted "I can't stop now; I have an injured man in the car." The decision does not mean that a vehicle conveying a sick or injured patient can ignore traffic directions. It is merely exempt from the speed-limit restrictions. The question is not whether the car is an ambulance but whether it is being used for ambulance purposes.

A Dispensary an Offensive Business

Mr. Justice Johnston of the Irish Free State decided in Dublin recently that a poor-law dispensary was an offensive business in the legal meaning of that phrase and therefore could not be carried on in premises the lease of which contained the covenant "not to carry on any noisome or offensive trade or business on the premises." This decision could not be used as a precedent in England and may yet be upset on appeal; but, even so, it is both interesting and disturbing. For the reasons given by the judge for his ruling apply to every medical institution and the consulting-room of every doctor.

These reasons were two: (1) where persons are collected for medical treatment there is risk of infection; and (2) the storage of drugs, including vaccine, is offensive. It is to be noted he used the words "thousands of people" and "considerable quantities," which suggest that the decision rested upon quantity and that had the premises been used as a surgery in a small way of business with but one or two tubes of vaccine stored there, a different decision might have been given; but the reasons remain the same.

In 1896 it was held that the use of a house in Fitzwilliam-square in Dublin as a private hospital for medical and surgical (but not infectious) cases was a breach of a covenant not to use the house for certain specified businesses or any other offensive or noisy trade, business, or profession (Pembroke *v.* Warren), and there is some English authority to the like effect. A different standard seems to be visible where it is a question of a statutory nuisance under the Public Health Acts (1875 and 1936). In this connexion in the case of Withington *v.* Manchester Corporation (1893) it was decided that a small-pox hospital was not an offensive business. The recent Dublin decision appears to depend upon the meaning of the words "noisome or offensive" in the covenant of a lease, which probably has a much wider significance than the restricted sense in which these words are used in the Public Health Acts. In his decision, as reported in the *Journal of the Irish Free State Medical Union* for January, Mr. Justice Johnston said nothing about any offence which might be caused by a crowd of dirty people awaiting treatment, but specified the risk of infection. That such a risk may occur cannot be denied, though we have more evidence of spread of infection in social gatherings of "healthy" people than in out-patient departments; but we do not know upon what grounds he decided this to be "offensive." Similarly, though the storage of drugs may be a potential danger, we are unable to see how it can be offensive. If it were, every chemist's shop and most bathrooms would be premises carrying on an offensive business. Since a small-pox hospital is not an offensive business, though it contains in maximum concentration the two objectionable features to which Mr. Justice Johnston referred—risk of infection and storage of vaccine—it should follow that no medical establishment can be an offensive business per se, though of course it may be carried on in such a way as to be a nuisance.

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GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A BACTERIOLOGICAL BACK-NUMBER

IV

A DAY or two ago there appeared in the personal column of a famous London daily the following item:—

S O S—Is there an AMERICAN SPECIALIST on BLOOD DISEASES in London? Pray answer this.

One forbears to smile as one never knows what anguish and misfortune may lie behind such an appeal; but one cannot help being curious as to the circumstances under which it was made. One could understand an application for a French chef or an Italian marble mason, but a skilled doctor it might be thought would have exercised the same skill the whole world over. There seems no way of getting any nearer the matter unless one were oneself an American specialist of the type required, and for lack of a better explanation we can only think that this entry in the agony column is one more illustration of the curious, complex, and largely irrational grounds upon which the average patient chooses his doctor. The patient certainly chooses his doctor on different principles from those which make him decide on his garage mechanic or a gardener. It is not a matter merely of choosing a knowledgeable and impartial expert and telling him to get on with it. No doctor is allowed to be merely ordinary. Patients delight in forming their own opinion of their doctors, though they might know that their judgment in the matter must be almost worthless. If they like their doctor he is everything that is perfect: if they don't, then "the reason why I cannot tell, I do not love thee Dr. Fell," and there's the end to it. The patient likes to talk of his doctor as a "clever" doctor though it is hard to see how the estimate of cleverness is arrived at. The patient will sometimes refer proudly to the "high qualifications" of his doctor, but he rarely seems to lay much stress on a mere string of degrees and diplomas. I have a good string myself—to be precise £156 worth—but I have never found myself accepted as a "clever" doctor; in fact I usually find it difficult to get anyone to believe that I am qualified at all. Appearances go for much and it is certainly important that a doctor should *look* like a doctor; but if we ask again what a doctor should look like it is not easy to reply. Perhaps the important thing is that he should not look quite like other people; there should be something mysterious about him—some slight reminder of the primitive and the occult, something to link him with the ancient medicine man whose memory still lies only superficially buried in the subconscious folk mind. That knowing young practitioner Mr. Bob Sawyer had got the idea when as he said "I put on a black suit of clothes and a pair of spectacles, and came here to look as solemn as I could." Even to this day the doctor must adopt a priestly conservatism in his dress and we find him wearing a stiff collar when everybody else around is wearing a soft one, and after all it is not so long ago when even in remote country districts the top-hat and frock-coat was still his daily garb.

* * *

When one considers the enormous temptations the ordinary practitioner has to adopt the methods of the quack it is a remarkable evidence of the morale and integrity of the profession that they resist the temptation. Ordinary patients certainly like a touch of quackery about their doctor and if the doctor has not got it naturally—and he usually has not—they insist upon investing him with it. We have all heard from patients the astonishing and mysterious statements alleged to have been made by brother practitioners. We have heard how the doctor has solemnly diagnosed a "chill on the liver" though we know perfectly well that our colleague has no such a diagnostic term in his vocabulary. We have a good idea of how these statements come about: a patient is very partial to his own diagnosis and as a wise doctor is chary and wary about it the patient takes the matter in hand and puts the necessary words into his mouth. The key is given in the old *Punch* joke—"I say it's measles, doctor, what's your humble, opinion?"

And patients seem sometimes to derive considerable satisfaction from running down their doctors. That is the natural reaction against the high and almost heroic legend which normally surrounds the doctor's craft. Human beings when they tire of their mumbo-jumbo are given to knocking him off his pedestal. In the old Greek plays the Gods were made to look foolish at times and King Arthur, so glorious in the romances, cuts some sorry capers in the fabliaux.

Patients will sometimes exult over their doctor's mistakes even when they are themselves the victims. A circular was recently left at the houses in the St. John's Wood neighbourhood. It was headed "Have You a Story" and it announced that a "Mr. H. V. Langley is completing a book on manipulative surgery, and would be pleased to receive personal experiences for publication relating to injuries or conditions treated by doctors prior to consulting Mr. Langley." We feel that if Mr. Langley is not going the right way to investigate the claims of manipulative surgery he certainly ought to be able to present some interesting data on the psychology of patients, and if as is stated the price of the promised book "will not exceed 6*s*." a copy I am not sure that I shan't have six shillings' worth.

* * *

It is curious that laymen so readily charge medical men with avarice. Probably no other profession ever does so many services for which it should be paid and yet is not paid and certainly no other profession has to work so intensely and with so little off time. True, a doctor has a certain standard of living and is, speaking generally, fairly well off; but his training is long and difficult and his standard of life is to some extent dictated by the patient rather than by himself. He has to have a car wherein to visit his patients and maids to open his door to them by day and night. A patient quite ready to complain of a very ordinary doctor's bill would snort if the doctor did his rounds on a push bike or a motor-cycle combination. I know an old doctor who dislikes cars and always goes his round on his feet and he tells me he only keeps the big American car which lies unused in his garage because "patients expect a doctor to keep a car even if he doesn't

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use it." Chaucer's doctor was allowed to be "a verrey parfit practisour" and the profession may well be proud of the character Chaucer gives to it; but even he finishes up with the remark:—

> "For gold in phisik is a cordial
> Therefore he lovede gold in special."

The older satirists, who were certainly out to find out the weaknesses of all professions, are generally hard on doctors and rarely fail to charge them with incompetence and greed. According to old John Earle the best cure his "Mere Dull Physician" has done "is done upon his own purse, which from a lean sickness he has made lusty" and lest surgeons should smile at the discomfiture of the mere dull physician let us add this item from his character of a surgeon: "The rareness of his custom makes him pitiless when it comes." Nicholas Breton gives us characters of both a worthy and an unworthy physician. "An unlearned and so unworthy physician is a kind of horse-leech, whose cure is most in drawing blood, and a desperate purge, either to cure or kill, as it hits"; but there is surely also a slight sting even in his remark on his worthy physician that "by the secret of his skill out of others' weakness he gathers his own strength."

Plato was more understanding and generous. "Then is it not true," he asks, "that no physician, in so far as he is a physician, considers or enjoins his own interest, but that all seek the good of their patients?" Elsewhere he tells us that "the science of medicine, in a word, is a knowledge of the love affairs of the body—and he is the most skilful physician who can trace those operations of the good and evil love, can make the one change places with the other, and attract love into those parts from which it is absent." By love in this sense Plato no doubt meant the harmony and health of body and mind, and if we demand a short answer we can hardly get a more satisfactory one to the question "what is the skilful doctor?"

PANEL AND CONTRACT PRACTICE

Messages

AN insured woman was taken ill late one evening and next morning her mother attended at the practitioner's surgery and obtained a prescription for medicine for the acute diarrhœa from which the daughter was suffering. The daughter took the medicine as directed but as her condition became worse during the day a message was sent to the doctor on the following morning asking him to visit her immediately and also her mother (a private patient) who had meanwhile had a seizure. The messenger called at the surgery before 9 A.M., and was assured that the practitioner would be informed as soon as he arrived at the surgery. At about 2 P.M., as the doctor had not then called, his surgery was rung up and the assurance given that the doctor had been told and might be calling any minute. An hour later the patient's condition having become worse another doctor was summoned, who gave an injection to ease the pain, and the insurance practitioner was notified that he need not now call. The second doctor remained in attendance for several days.

When the medical service subcommittee inquired into the circumstances the practitioner agreed he had received the first request for a visit but no indication of any degree of urgency. He finished his surgery work at about 12.30 P.M. and made seven visits before lunch at about 2.20 P.M. He did not receive the two o'clock message; this message reached his assistant who lived at the surgery, and as he and the assistant had prepared the visiting list together and marked urgent cases the assistant assumed the principal would be visiting this patient. The three o'clock message taken by his housekeeper and cancelling the request for a visit came just before he went out again, and he interpreted it as meaning that the insured person's condition had improved.

The committee was satisfied that the practitioner received the first message but did not realise that his services were urgently required; that the second message was received at his surgery but was not transmitted to him, and that he was negligent in not making proper arrangements for the transmission to him of messages received during his absence from the surgery; and that he failed to visit and treat the patient whose condition so required. They decided to recover from the doctor the expense incurred in calling in the services of the second doctor and to repay the amount to the person by whom the expense was incurred; and while in this instance they did not propose to ask the Minister to withhold money they would be compelled to take a more serious view another time. The doctor is to be asked to make more satisfactory arrangements for the receipt and transmission of messages.

In a case such as this it is often difficult to distinguish between the occasional miscarriage of the best-laid plans and the failure to make reasonable provision. No doubt the original messenger intended to convey that a visit was urgently necessary, and clearly the doctor did not get the impression that this was so—in fact, he said he was told he was wanted for the patient's mother "and while there to see the insured person." Short of a machine of the dictaphone type to record the actual words of the messengers practitioners can hardly avoid the risk of failing some time or other to appreciate the urgency of a call which is really urgent. And even then the inflection of the voice may make all the difference in the meaning of "Will doctor please come as soon as he can."

The Drug Tariff

At present insurance practitioners are supplied with a copy of the drug tariff once a year. Representations have been made to the Minister by the Insurance Acts Committee that practitioners ought to have a copy of each (quarterly) issue. The Minister has agreed to do this but has suggested that the most suitable course to pursue is to supply a copy of the tariff once a quarter to those practitioners who wish to have it so often. The London panel committee has circularised all its constituents asking how they feel about it.

Road Traffic Act

The London panel committee has been informed that an insurance company refused to pay a fee to a doctor for emergency treatment under the Road Traffic Act on the ground that the written application had not been sent by registered post. The Act provides that written applications for fees are to be delivered to the person who was using the vehicle or sent by registered post. This should be borne in mind.

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CORRESPONDENCE

TRANSFUSION OF FLUIDS IN INFANCY

To the Editor of THE LANCET

SIR,—Dr. Ormiston, in his article in THE LANCET of Jan. 8th, is obviously only concerned with the infant when in hospital. By the time a child comes to hospital he is very ill and the various routes which Dr. Ormiston suggests are the only obvious ones. I should like to point out that the moment when the giving of fluids is most efficacious is in the home when the acute vomiting has subsided. The child should be given bottles full of half-normal saline by the mouth, and he should be allowed to drink as much as he wants for the first twenty-four hours, no food being given during this period. I have often been impressed at the amount of saline a child will consume; for instance an infant of three months' old will take as much as a pint of fluid in this way in twenty-four hours. The practical point is to get as much fluid into the body as possible while the child can suck vigorously. The good results of this treatment can be seen next day. The sooner the acid-alkali balance is restored the better the prognosis in all cases of vomiting and diarrhœa.

It is the general practitioner in the home who has the best chance of restoring this balance, long before the case gets to hospital. I have found that if an infant suffers from diarrhœa and vomiting for three days without any attempt being made to restore fluid to the body that child is in great danger, and these are the cases that help to keep up the unnecessarily high infant mortality from diarrhœa and vomiting during the first year of life.

A condition of alkalosis is left after the acute vomiting subsides and the chloride in the half-normal saline helps to counteract this alkalosis. The normal balance between acid and alkali is an extremely delicate mechanism and I cannot do better than quote Dr. H. L. Marriott, who says that "some idea of the delicacy of the adjustments to maintain acid-alkali balance and its maintenance may be obtained by a consideration of the fact, namely, that a reaction of the blood as acid as distilled water or as alkaline as ordinary tap water is incompatible with life."

The good results which I have obtained during the last thirteen years, in 1419 cases of diarrhœa and vomiting with only 47 deaths, making 3·8 per cent., are largely due I think to the early treatment in the home that I have described.

I am, Sir, yours faithfully,

Kensington, Jan. 15th. RONALD CARTER.

PHARYNGEAL AND LARYNGEAL NYSTAGMUS

To the Editor of THE LANCET

SIR,—More than fifty-one years ago I published in your columns,[1] under the above title, a clinical observation of continuous rhythmic movements of the pharynx and larynx, in a girl aged 16, who suffered from a cerebellar tumour: ocular nystagmus was also present and was synchronous with the movement in the pharynx and larynx. In calling this latter movement "nystagmus" I pointed out that the term was not strictly accurate etymologically, and in my second communication correcting a verbal error (cerebellar for cerebral) I used the word "clonus."

Since that date a small number of similar cases have been published—according to N. Leshin and T. T. Stone,[2] 26 up to the year 1931—the authors variously using the terms nystagmus, nystagmoid, or rhythmic continuous movements, myoclonus, rhythmic myoclonus, &c. The most recent authors, G. de Morsier and R. Junet,[3] entitle their paper "les myoclonies velo-pharyngo-laryngées," kindly speak of the "syndrome de Spencer," and quote my original communication. I think it would be preferable if these cases were published under the heading "nystagmus." It is true that that word, which etymologically means "nodding, drowsiness," is a very inaccurate term for the movement, either of the eyes or throat; but it is of respectable antiquity as a label for the continuous rhythmic movement of the eyes, and may be applied to the similar movement of the pharynx and larynx. The word "clonus" is even less suitable etymologically and is in practice usually employed for temporary and violent muscular contractions. The use of the term nystagmus for the throat condition points to its frequent association with the ocular movement, and perhaps may lead to more frequent and careful examination of the throat in cases of ocular nystagmus and cerebral and cerebellar tumours and diseases, and to the further elucidation of the pathology of this syndrome, in which some progress has been made.[3]

Sir, it is a long time since the appearance of my first medical publication, Pharyngeal and Laryngeal Nystagmus: I have a liking for the title still. Perhaps you will allow me to quote, in relation to this little matter, a great name, William Harvey, who concludes the preface to his "Generation of Living Creatures" (1653) thus: "For as they which finde out new plantations and new shores, call them by names of their own coyning, which posterity afterwards accepts and receives; so those that finde out new secrets have good title to their compellation. And here, methinks, I hear Galen advising; *If we consent in the things, contend not about the words.*"

I am, Sir, yours faithfully,

HERBERT R. SPENCER.

Bickenhall Mansions, W., Jan. 14th.

THE LONDON M.B. FINAL

To the Editor of THE LANCET

SIR,—I am amazed at the warmth of feeling manifested in Sir E. Graham-Little's recent contributions to your correspondence columns when he speaks of the Conjoint Board and its students. He would do well to remember that a large proportion—perhaps even a majority—of the medical practitioners in this country owe their status entirely to their L.R.C.P. and M.R.C.S., and there must be many who, like myself, are grieved by the imputation that we are not worthy of our London medical schools. Whatever the University Grants Committee may have to say where finance is concerned, or the court of the University where its undergraduates are concerned, it would be an evil day for the people of this country if all who were unable to obtain a degree in medicine were excluded from the Register. So would London University have lost two recent deans of the Faculty of Medicine, several professors, and many members—largely surgeons—from the staffs of its teaching hospitals.

[1] *Lancet*, 1886, 2, 702, 758.

[2] *Arch. Neurol. Psychiat., Chicago*, 1931, 26, 1236.
[3] *Schweiz. med. Wschr.* 1937, 67, 996.

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A man who is excluded by his inability in some preliminary science or by financial pressure from registering any but the Conjoint diplomas is not necessarily an incompetent practitioner; far from it, many of the best and wisest among us are proud to write only L.R.C.P., M.R.C.S. after our names. And if Sir Ernest must see that some of us have examination as well as professional ability, let him look down the lists of M.R.C.P. and F.R.C.S. diplomates and note that some at least of those without an M.B. could have made short work of the London final.

Let London University decide how best to manage its examinations, but leave out disparaging references to the Colleges and those who hold—or hope to hold—their diplomas. Many of us are disinterested in the subject recently under discussion, but we are proud of our L.R.C.P., M.R.C.S., and our medical schools.

I am, Sir, yours faithfully,

Jan. 17th. ONLY CONJOINT.

To the Editor of THE LANCET

SIR,—Certain figures for 1936–37 which were presented to the court at its meeting on Jan. 12th, and which therefore came under my notice, oblige me to correct the description derived from earlier and somewhat misleading statistics which I gave, in my letter to you of Jan. 8th, of the composition of the student-body in London medical schools. A more accurate statement of the present position would be that rather more than half of the students in those schools are reading for the London University degree; rather less than one-sixth for other university degrees, chiefly Oxford and Cambridge; approximately one-third for non-university qualifications, chiefly Conjoint Board.

I am, Sir, yours faithfully,

E. GRAHAM-LITTLE.

Wimpole-street, W., Jan. 15th.

THE DANGERS OF THOROTRAST

To the Editor of THE LANCET

SIR,—I was glad to note the warning sounded in your annotation of Jan. 1st on the use of Thorotrast. It is surprising to hear that this drug is still being used in man. In the application of a new *therapeutic* method one must be prepared for occasional untoward incidents, even though extended experiments on animals may have indicated that the preparation is harmless. But with a preparation which serves only *diagnostic* purposes one ought to demand absolute harmlessness. As recent publications appear to give the impression that thorotrast was not thoroughly investigated before it was marketed, may I refer to investigations that I carried out with the preparation 1073a (later given the trade name thorotrast) in 1930–32.[1-3]

Experiments were carried out on 40 rabbits and about 100 rats. The results with the rabbits were published after 18 months' observation. All the animals tolerated even ten times the dose that is usually applied in man, without the slightest disturbance during the whole period of observation, provided the injection was made slowly, diluted with glucose, and given at intervals of 24 hours. The blood count did not show any noticeable change in spite of the fact that from the third to the fifth month (according to the quantity of thorotrast given) a great deal of thorium was found in the bone-marrow. But injected animals were found to die after the slightest interference such as the giving of an anæsthetic or the withdrawal of a small quantity of blood.

My investigations yielded the further following results:

1. Phagocytosis decreased from the normal 38 per cent. to 4·2 per cent. six to twelve months after giving thorotrast. (The leucocytes were taken from artificially produced ascites.) The decrease in phagocytosis was not significant immediately after the application of thorotrast, but increased gradually.

2. Thorotrast was found to be stored in the reticulo-endothelial cells. These were soon destroyed and the thorotrast particles were taken up by freshly regenerated reticulo-endothelial cells.

3. Liver and spleen showed degenerative processes like an atrophic cirrhosis.

4. Capillaries and small vessels were filled up by thorotrast, possibly being stored within the endothelial cells, and thrombosis frequently followed.

Accordingly a warning was sounded against the use of thorotrast in man.

Selbie [4] in 1936 showed that small subcutaneous doses of thorotrast may produce sarcoma in rats, and last year Northfield and Russell [5] published 5 cases in which cerebral thrombosis followed arteriography. If Freeman after ventriculography (longest evidence after two months) finds only thickening of the meninges at the base of the brain, with a large amount of thorotrast still lying free in the spaces, it is probable that the thorotrast particles wander later into different organs and lead to thrombosis, as I was able to demonstrate. In any event ventriculography can be done without this danger—e.g., by injection of air. It is difficult to imagine that further workers will follow out the suggestion that thorotrast should be used for ventriculography when regard is had to the danger of the method and also to the satisfactory results obtained by simple injection of air.

I am, Sir, yours faithfully,

Welbeck-street, W., Jan. 14th. Z. LEITNER.

GASTRO-INTESTINAL SIGNS OF NUTRITIONAL DEFICIENCIES IN CHILDREN OF SCHOOL AGE

To the Editor of THE LANCET

SIR,—As long ago as 1926, when exploring the effects of ultra-violet radiation on the common ailments of school-children, I found that the frequent vomiting attacks from which so many children suffer were strikingly benefited by this treatment—so much so that it became my custom almost to guarantee cure of such cases by radiation. A type of ailment which seemed to me somewhat akin to cyclical vomiting consisted in frequently recurrent abdominal pains, apparently colicky and often aggravated by taking food. This also I found to be greatly improved in many cases, and in some completely relieved, by radiation. The radiation was from a mercury-vapour lamp, and was given twice weekly. In subsequent years once-weekly radiation was found to give the same results. So far as I know, the benefit of ultra-violet radiation in this type of case has not been noted by anyone else.

Speculating as to the rationale of this treatment, I tried the effect of calcium and vitamin D in the form of Ostocalcium tablets (Glaxo), 1 tablet three

[1] Anders, H. E., and Leitner, Z., *Klin. Wschr.* 1932, **11**, 1097.
[2] Bucky, G., and Leitner, *Fortschr. Röntgenstrahlen*, 1932, **45**, 561.
[3] Leitner, *Ibid.* 1932, **46**, 47.
[4] Selbie, F. R., *Lancet*, 1936, **2**, 847.
[5] Northfield, D. W. C., and Russell, D., *Ibid*, 1937, **1**, 377.

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times a day, each containing calciferol 500 international units of D. Both the vomiting and the recurrent colic cases showed improvement, but the effect was not so striking or consistent as with radiation. I concluded, therefore, that radiation does something more than mobilise vitamin D in the body. A recent observation of Yoder[1] indicates that vitamin D is necessary to normal gastro-intestinal functioning. Is the benefit of ultra-violet radiation and of vitamin-D administration due to improved calcium metabolism? If so, does the calcium act by lessening the tendency to acidosis, or by its effect on the tonicity of the involuntary muscle of the alimentary tract, or both? Or are these two effects one and the same thing?

I had for many years suspected that insufficient vitamin-B intake predisposed to these gastro-intestinal crises. Acting on this idea, I have recently treated a series of several dozen cases with vitamin B_1, given as synthetic aneurin in the form of Benerva (Roche). One benerva tablet a day gives 500 I.U., which is regarded as an optimal dose.[2] In every case in which this treatment was continued for more than a week there was a striking improvement, particularly in the vomiting cases. In the majority the treatment was continued and followed up for at least four weeks. Vomiting, which had been recurring fairly frequently and regularly for long periods—often one, two, or three attacks per week—almost always ceased in the first week and did not recur during the giving of the B_1 tablets. In several cases the parent spontaneously volunteered the additional information that the child was brighter and more lively, probably because this vitamin stimulates oxidation and general nervous well-being.

It is well established that ultra-violet radiation promotes general nervous stability and well-being, being a fairly reliable remedy for nervous fidgetiness, restlessness, fretfulness, poor sleep, poor appetite, and all the other symptoms generally classed under the heading of debility. It is of some interest that ultra-violet radiation and vitamin B_1 should have similar effects both in the remedy of these abdominal crises and in promoting general nervous stability. Ultra-violet light and vitamin D probably act on one metabolic cycle, that of calcium, and vitamin B_1 on another cycle, that relating to neuromuscular tonicity and oxidation. While the improvement of one or other of these processes may be sufficient to bring about a cessation of symptoms, it seems likely that the simultaneous treatment of both nutritional deficiencies would be more effective. In view of the remedy of these abdominal crises by nutritional means, it seems justifiable to regard their occurrence as a sign of nutritional deficiency.

I am, Sir, yours faithfully,

Birmingham, Jan. 12th. E. H. WILKINS.

VITAMIN-C DEFICIENCY

To the Editor of THE LANCET

SIR,—Prof. Leonard Parsons is under a misapprehension in his Withering lecture, published in your last issue, when he assumes that I dismiss the existence of latent scurvy as characterised by vague symptoms of ill health and by a response to specific treatment. I fully accept the term when used in this sense. My criticism is levelled against the reckless application of this and the whole gamut of similar terms to a condition of "unsaturation" in which the individual is in apparently perfect health and is often even near the "saturation" point.

I am, Sir, yours faithfully,

S. S. ZILVA.

Lister Institute of Preventive Medicine, Chelsea Bridge-road, S.W., Jan. 15th.

[1] Yoder, L., *Amer. J. Dig. Dis. Nutr.* 1937, 3, 829.
[2] Baker, A. Z., Wright, M. D., and Drummond, J. C., *J. Soc. chem. Ind.* June, 1937.

"REVOLT OF THE DOCTORS" IN AMERICA

To the Editor of THE LANCET

SIR,—I am grateful to you, as I am sure are all the other members of our committee, for the friendly and serious discussion which you have given in your editorial of Nov. 27th to our Principles and Proposals for the improvement of medical care. I am grateful also for the extended report of the subject by your correspondent in THE LANCET of Dec. 18th (p. 1450). I must, however, draw attention to an inaccuracy in your correspondent's report where he refers to the events that took place at the Atlantic City meeting of the American Medical Association. The resolution introduced for the New York State Medical Society by Dr. Samuel J. Kopetzky was not introduced at the suggestion of our committee and was a modified form of our proposals which our committee has not approved. Your correspondent also states that "The resolution was defeated by a very large majority." He is hardly to be blamed for this misstatement since he has no doubt taken it from an editorial in the *Journal of the American Medical Association* (Oct. 16th, p. 1280), where it is stated that "a resolution from the House of Delegates of the New York State Medical Society, obviously a slightly modified form of the American Foundation proposals, was introduced in the House of Delegates of the American Medical Association at Atlantic City and there rejected with an enthusiastic unanimity which indicated quite clearly the utter dissatisfaction of the medical profession with these proposals."

It is very important to us that the inaccuracy of this statement should be thoroughly understood. The impression in the lay press and elsewhere that there is a "revolt" among American physicians arises entirely from this editorial in the official journal of our Association. What actually happened at Atlantic City was something very different and may be read in the report of the proceedings of the house of delegates (*J. Amer. med. Ass.* 1937, **108**, 2128 and 2208). Dr. Kopetzky's resolution is found on p. 2142. On p. 2217 the first report of the reference committee states that "this subject presented here is too important, too vast and too widespread in its application to be justly and adequately considered in a few hours or even a few days by any reference committee. It recommends that the resolution be referred to the Board of Trustees of the American Medical Association for consideration and action at the earliest possible time." The house of delegates did not accept this recommendation and referred the matter back to the reference committee who were, therefore, obliged to report again and their second report is found on p. 2220. This report is too lengthy to be summarised in this letter, but you will find that it points out in detail that certain of our Principles and Proposals have already been recognised by the American Medical Association, and states that the Association is "genuinely interested in all plans for providing and distributing medical care." It goes on to recommend "that the bureaus, councils and committees of the Association continue their studies of the need for and the methods of distributing medical care, to the end that the

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American Medical Association shall continue to do everything possible to promote and protect the health of the American people." On motions duly seconded and carried, the report of the reference committee was adopted.

After the passage of this resolution by the house of delegates, our committee submitted for the first time its Proposals to the various medical organisations of the country in order that they might receive that discussion and consideration which the house of delegates of the American Medical Association had promised to them. If this matter had been put before the newspapers in its true light, it could not have been interpreted as "revolt." Our committee hopes that in spite of the unfortunate editorial in the official journal of our Association, our colleagues may still be prepared to give their dispassionate consideration to our Proposals. We do not ask for more, and the growing number of adherents to the Proposals does suggest to us that discussion and consideration are taking place.

I am, Sir, yours faithfully,

J. ROSSLYN EARP.

Department of Health, Albany, N.Y., Dec. 29th, 1937.

*** A more detailed account of what happened at Atlantic City on June 7th, 1937, was given in an earlier letter from one of our correspondents (*Lancet*, 1937, **1**, 36).—ED. L.

FOMENTATIONS OR LYMPHATIC CONTROL?

To the Editor of THE LANCET

SIR,—Old traditions and customs die hard, and I fear it may be long before foment, stupe, and poultice pass away. Yet it is high time that the use of these moist hot applications was abandoned, at any rate in cases of septic infection.

The first objection to the foment—that it tends to spread infection under its shelter—is increasingly recognised. My object in writing this letter is to draw attention to another and perhaps more serious danger, and to an alternative form of treatment that I have found most valuable. The danger I have in mind is that any form of foment or poultice dilates the lymphatic channels around the septic lesion and thus promotes the central flow of infected lymph. The method of treatment I call "lymphatic control."

We are all familiar with the red streak running up the arm in a case of acute infection of the hand, and following the anatomical text-books we are apt to think of the infective process spreading upwards through a single channel. This is incorrect; there is not a single channel but a group of small ones, and investigation shows that they have very thin walls, compared with veins, and are therefore *independently compressible*. The practical bearing of these facts is that it is possible by applying *light* compression (lymphatic control) to stop the passage of infection centrally through the lymphatic vessels—a method of treatment infinitely preferable, I need hardly say, to the opening-up of these channels around the lesion by a fomentation.

When I have recommended this method people have said to me: "But surely this is only Bier's treatment by hyperæmia?" Actually it is nothing of the kind. Bier's method is to prevent the flow of blood through the vein—a process requiring considerable pressure which can only be borne for a limited period. Bier's object was to add congestion to congestion. In practice, however, his technique is by no means always carried out effectively; indeed the application of the bandage lightly (light Bier's congestion) has sometimes been recommended, and has many successes to its credit. In my view this "light Bier's congestion" is a contradiction in terms, and whenever a wide elastic bandage is applied for a sufficient period in the right place the practitioner is really adopting my "lymphatic control."

The purpose of this measure is, as I have said, to prevent the central spread of infection through the lymphatic channels, and this I achieve by binding Elastoplast firmly over the limb on the proximal side of the lesion (but not over it, except perhaps in subacute cases, when an opening should be left for escape of discharge, if any). The controlling bandage must be left on for at least several days after the discharge has ceased. I sincerely hope this method, which I have found so effective, will receive general trial.

I am, Sir, yours faithfully,

London, Jan. 17th. J. L. AYMARD.

WHO PAYS THE DOCTOR CALLED TO AN ACCIDENT?

To the Editor of THE LANCET

SIR,—In reference to Mr. Harcourt Kitchin's letter, I can say from the experience of one hospital that there is really not much difficulty in collecting the 12*s*. 6*d*. for the emergency treatment of road traffic accidents, and I believe that is the general experience where arrangements have been established in accordance with the procedure suggested by the British Hospitals Association. It may be worth while to note, however, that the tariff companies and those in association with them have agreed to an arrangement which will appreciably add to the income of the hospitals from this source. Until the end of last year if a patient was admitted into hospital then the 12*s*. 6*d*. was deducted from the amount received in respect to the in-patient treatment. The companies have now agreed to a more generally accepted interpretation of the law that the hospitals are entitled to this sum in addition, even if the patient becomes an in-patient.

In this connexion there is a point of practice which may be of some general interest. Before the Act of 1934 was passed it was agreed by the hospitals that the cost of the first treatment was 5*s*. It is clear from the provisions of the Act that the bulk of the payment is intended for the personal services of the doctor. Accordingly the committee of King's College Hospital have allocated a sum of 7*s*. 6*d*. out of the emergency fee to a medical staff fund at the disposal of the medical board.

I am, Sir, yours faithfully,

C. E. A. BEDWELL,
House Governor.

King's College Hospital, London, S.E., Jan. 17th.

ROYAL SANITARY INSTITUTE.—Lord Bessborough will preside over the health congress of this institute which is to be held at Portsmouth from July 11th to 16th. There will be sections dealing with preventive medicine; architecture, town-planning and engineering; maternity, child welfare and school hygiene; veterinary hygiene; national health insurance; hygiene of food; and tropical hygiene. Conferences of representatives of local authorities, medical officers of health, engineers and surveyors, sanitary inspectors and health visitors will also take place during the congress. Further information may be had from the secretary of the Institute, 90, Buckingham Palace-road, London, S.W.1.

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PUBLIC HEALTH

VITAL STATISTICS FOR 1937

THE Registrar-General has issued a provisional statement of the figures for birth-rate, death-rate, and infant mortality for the year 1937.

—	Birth-rate.	Death-rate.	Infant mortality-rate.
England and Wales ..	14·9	12·4	58
125 county boroughs and great towns, including London	14·9	12·5	62
148 smaller towns ..	15·3	11·9	55
London (administrative county)	13·3	12·3	60

The smaller towns are those with estimated resident populations of 25,000–50,000 at the 1931 census.

Note.—The birth- and death-rates for England and Wales as a whole are calculated on the estimated mid-1937 population, but those for the towns aggregates and for London on the estimated mid-1936 populations. The birth-rate is based on live births and the death-rate on crude deaths.

The birth-rate for 1937 is 0·1 per 1000 above that for 1936, 0·2 above that for 1935, and 0·5 above that for 1933, the lowest recorded. The crude death-rate is the highest on record since 1929, and is 0·3 above that for 1936, an increase that is largely associated with the heavy influenza mortality of the first quarter of the year. The infant mortality is 1 below that of 1936 and only 1 above that of 1935, the lowest record. The rates are provisional and are issued for the information of medical officers of health, but they are not likely to need substantial modification.

CONTROL OF DISEASE SPREAD BY AIRCRAFT

The International Sanitary Convention for Aerial Navigation, signed at The Hague in 1933 and ratified by the British Government in 1934, has now been implemented by the issue of the Public Health (Aircraft) Regulations,[1] which are to come into force on July 1st.

The convention of 1933 aimed at achieving for aircraft, with the necessary modifications, what the International Sanitary Convention of 1926 had done for shipping—on the one hand to prevent the spread of the more serious epidemic diseases from country to country, and on the other hand to provide safeguards against interference, delay, and expense from unwarranted and discrepant sanitary and quarantine measures. The differences between the two conventions are those of emphasis rather than principle. Since the most important vector of disease carried by shipping is the rat, the 1926 convention was mainly concerned with measures against rats and plague: the vector carried by aircraft which is most to be feared, however, is the mosquito; hence the 1933 convention laid greatest stress on measures against insects and yellow fever. The new regulations are based on Section 143 of the Public Health Act, 1936, which gives the Minister of Health power to make regulations for the prevention of infectious disease; but since in this country none of the "Big Five" diseases with which the International Sanitary Convention for Aerial Navigation mainly deals—plague, cholera, yellow fever, typhus, and small-pox—is now endemic or epidemic, the measures envisaged in the regulations will serve to prevent the introduction rather than the export of these diseases.

[1] H.M. Stationery Office. 1937. 5*d*.

THE ARRANGEMENTS AT AERODROMES

Broadly speaking, the organisation set up is as follows.

Local authorities may, and if required by the Minister, shall, provide at customs aerodromes for which they are the sanitary authority, medical officers to assist the medical officer of health in carrying out the regulations, premises and waiting-rooms for medical examination and temporary isolation, and means of transport and hospital accommodation. If the Minister is satisfied that a customs aerodrome has an organised medical service with, besides the above facilities, equipment for taking specimens for pathological examination, apparatus for disinfection and for getting rid of insects and rats, and a pure water-supply and adequate system for the disposal of waste water and excreta, and also that the aerodrome is kept as far as possible free from rats, he may recognise it as a "sanitary aerodrome" and it may then be designated as a local area for the purpose of notification of infectious disease. The names of sanitary and authorised (i.e., customs) aerodromes are to be communicated to the International Health Office in Paris, which has already issued the first list of those in the various categories (July 31st, 1937).

It should be noted that the local authority responsible for carrying out the regulations is the local authority maintaining the aerodrome, in the first place, and, secondly, the sanitary authority in whose area the aerodrome is situated. In the case of an aerodrome serving, but not maintained by, a large town, and situated in a rural area outside the town, it is presumably the rural district council that is financially responsible for the provision of its sanitary services.

Aircraft which are infected—i.e., which have or recently have had on board a case of one of the above-named convention diseases—are subject to certain measures, such as disinfection, appropriate to the disease as laid down in the convention and appended as a schedule to the present regulations. Some of these measures must be carried out at a sanitary aerodrome. Others, such as the medical inspection and isolation or surveillance of passengers and crew may be performed by the medical officer at a customs aerodrome. Similarly aircraft coming from an infected locality, as notified in the weekly record of infected areas circulated by the Ministry of Health, are also subject to measures. Just as in port sanitary work, customs officers must be provided with lists of infected areas and have power to detain aircraft for medical inspection up to a maximum of three hours.

As far as aircraft leaving this country are concerned, the medical officer has similar powers of inspection, prohibition of embarkation, and enforcement of other measures only in the unlikely event of aircraft leaving an area which has been declared infected with plague, cholera, yellow fever, or typhus and small-pox in epidemic form. A most interesting clause is 11 (2): "If severe small-pox (variola major) exists in any part of Great Britain, the medical officer may prohibit any person coming from such part, who has been in such contact with any person suffering from the disease as to render him liable to transmit infection, from embarking on any aircraft going beyond Great Britain, Ireland, the Channel Islands, and the Isle of Man. Provided that etc. . . ." This, we think, is the first occasion on which a distinction between severe and mild small-pox (variola major and minor) has been drawn in an official

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regulation. The distinction is not made elsewhere in the regulations nor is it found in any of the international sanitary conventions. Should mild small-pox again become epidemic in this country, it is likely that trouble with continental countries may arise over this clause.

Duties are laid on commanders of aircraft similar to those laid on commanders of vessels—e.g., of notifying deaths and cases of infectious disease on board, of making entries on sanitary matters in their journey log-books and of complying with directions given them by authorised sanitary officers. Charges for sanitary measures can be recovered by a local authority undertaking the work but the charge must not exceed the actual cost of the work.

If a comparison is made between these regulations and the international convention on which they are based some few further points of difference will be noted. For example, the convention requires a sanitary aerodrome to have "one or more sanitary inspectors" as well as at least one medical officer; the regulations merely require "at least one assistant officer" acting under the medical officer; also no provision is made in the regulations for implementing Article 14 of the convention which forbids "aircraft in flight to throw or let fall matter capable of producing an outbreak of infectious disease." Perhaps, however, it is considered that the point is covered by Article 13 of the Consolidated Air Navigation Orders; this forbids any article, save ballast, to be dropped from an aircraft in flight.

THE RISKS

What are the risks of the introduction of cholera, plague, typhus, yellow fever, and small-pox into this country by aircraft or their passengers? It is true that aircraft may easily arrive in this country within the 5–14 days' incubation period recognised by the convention for these various diseases. It is true that —in the Far East—a death from cholera has occurred on a plane and another death arose from it. It is true that a rat has been carried on a plane and that an immense variety of insect life has been found in aircraft in various parts of the world.[a] On the other hand, Great Britain is in the fortunate position that nearly all aircraft coming from areas in which the Big Five diseases are endemic or epidemic would naturally land in other countries before they arrived here: hence our first line of defence is in the hands of others and the responsibility does not rest primarily with us. Secondly, except in the case of small-pox, conditions in this country do not favour the spread of these diseases even if introduced.

Indeed, the main importance of the new regulations is that they fulfil an international obligation and provide machinery and powers against a danger which for this country is at present more theoretical than real but may not always be so.

OBITUARY

MALCOLM BRICE SMYTH, M.B. Dubl.

THE death of Dr. Malcolm Smyth in Belfast a month ago came after a comparatively short illness. Until near the end of his life he was in his usual good health and actively engaged in hospital work and practice, and the end was a shock to his many friends and patients.

Malcolm Smyth is described as a man with few equals—a much-loved colleague, a skilled physician, an example of the best type of family doctor, and a good sportsman. He graduated from Trinity College, Dublin, in 1900, and went to the Royal Victoria Hospital, Belfast, first as house surgeon. At the time of his death he had been nearly thirty years on the staff of the hospital, which was founded by his father and the late Sir John Fagan. For several years he was also a member of the honorary staff of the Belfast Maternity Hospital. At last year's meeting of the British Medical Association in Belfast he was a vice-president of the section of diseases of children.

Sir Robert Johnstone writes: "The death of Malcolm Brice Smyth brings to a close the service to medicine of a family which for two generations took a high and honourable place in the medical life of Belfast. His father and his elder brother were both on the staffs of the Maternity Hospital and of the Queen-street Children's Hospital, and were active in their management. Not long after Malcolm commenced practice in Belfast his elder brother died, and he took the vacant places in the two hospitals. He gave yeoman service at the Maternity Hospital until 1922, when he retired from the active staff, but he remained connected with the Children's Hospital until his death. Much of his best work was done there, and his skill, his patience, and his kindly common sense endeared him to patients and colleagues alike. He commanded the confidence and enjoyed the friendship of a wide circle of private patients, and justly, for as a Belfast consultant said to me after his death, 'of all the practitioners I have met, Malcolm Smyth knew most about the case and about the patient. He was very thorough.'

"No notice of him would be complete which did not mention his fondness for field sports. The rod and the gun had claimed him for their own and he was never happier than when out on the moor, or the bog or the river. In his youth he was a prominent rugby man, and had been captain of the Trinity fifteen. His marriage was an ideally happy one, and to his wife and his three daughters goes out the sympathy of his many medical friends who have lost in him a valued colleague, the last of a family who in their lives worthily upheld the highest and best traditions of medicine."

ERNEST EDWARD AUSTEN, D.S.O., F.Z.S.

Major Austen was not a member of the medical profession. He was a zoologist. But his work gave him an intimate contact with the development of tropical medicine in this country.

His connexion with the British Museum dated from 1889, and from 1927 to 1932, when he retired, he was keeper in entomology. To scientists at large he will be best known for his momentous work on tsetse flies. From a monograph appearing in 1903 this was expanded in 1911 into a handbook superbly illustrated by Signor Terzi, and it has remained the standard work ever since. When he began the study of the tsetse flies only two species had been recognised, but in his last survey in 1922, in collaboration with E. Hegh, no less than twenty-two were described and their life-histories worked out. One of them, *Glossina austeni*, bore his name.

[a] E.g., Symes, C. B., *Bull. Off. int. Hyg. publ.* 1936, **28**, 1357; *Publ. Hlth Rep., Wash.* 1937, **52**, 414; H. Richards, communication by the delegate for the Anglo-Egyptian Sudan to the International Office at the October, 1937, session.

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Austen's special subject being the diptera, he worked widely in this group and produced many studies on other species of blood-sucking insects, while his work on the common house-fly was put into practical use during the late war in Egypt and Palestine. In 1895–96 he served as a naturalist on board Siemens Bros. cable-ship, the *Faraday*, on the Amazon, and in 1899 he accompanied Sir Ronald Ross to Sierra Leone with the first expedition of the Liverpool School of Tropical Medicine to devise practical prophylactic measures against anopheles mosquitoes. In much of his later work he was intimately associated with Sir Patrick Manson at the London School of Tropical Medicine. He was also one of the mainstays in the establishment of the Royal Society of Tropical Medicine and Hygiene and served for many years on its council, later becoming a vice-president. Apart from his research work his services were constantly in demand as a member of departmental committees at the Colonial Office.

A man of particularly fine physique and of soldierly bearing, Austen was a keen volunteer and later a territorial. He served with the C.I.V.'s in the South African War, obtaining the Queen's medal with four clasps. In the late war he went to France in 1914 and commanded a company of the Artists' Rifles. Later he was transferred to the Egyptian Expeditionary Force for special duty on malaria and other fly-borne diseases, and he gave yeoman service for the next 3½ years, being mentioned in dispatches and awarded the D.S.O. His work played no small part in the successful issue to Allenby's Palestine campaign.

Austen impressed acquaintances as well as friends by a certain loftiness and nobleness of character. He was a delightful and learned companion and was much sought after in officers' messes during the war for his powers of conversation and his wide knowledge of military history. He was a fluent writer and a good speaker. His advent in a camp, although particularly welcome, was not always looked upon with favour by medical officers in charge of sanitation in desert areas, for even on the hottest day his walking pace would often average 5½ miles an hour.

He died on Sunday last at the age of 70, leaving two daughters.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 8TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2139; diphtheria, 1584; enteric fever, 24 (23 "expected"); pneumonia (primary or influenzal), 1626; puerperal pyrexia, 192; cerebro-spinal fever, 37; acute poliomyelitis, 5; acute polio-encephalitis, 2; encephalitis lethargica, 3; dysentery, 256; ophthalmia neonatorum, 112. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Jan. 14th was 4204, which included: Scarlet fever, 778; diphtheria, 1428 (diphtheria carriers, 27); measles, 541; whooping-cough, 336; puerperal fever, 17 mothers (plus 13 babies); encephalitis lethargica, 281; poliomyelitis, 2. At St. Margaret's Hospital there were 23 babies (plus 11 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox, 8 (1) from enteric fever, 36 (5) from measles, 5 (1) from scarlet fever, 20 (4) from whooping-cough, 49 (8) from diphtheria, 64 (19) from diarrhœa and enteritis under two years, and 77 (7) from influenza. The figures in parentheses are those for London itself.

Five deaths from typhoid were reported from Croydon, 1 each from Willesden and Derby. Liverpool had 7 deaths from measles, Manchester 5, Wigan 3. Liverpool also reported 4 deaths from whooping-cough, no other great town more than 2. Diphtheria was fatal in 33 great towns, Liverpool reporting 5 deaths, Manchester 3.

The number of stillbirths notified during the week was 275 (corresponding to a rate of 37 per 1000 total births), including 52 in London.

MEDICAL NEWS

University of Oxford

At recent examinations the following candidates were successful:—

FINAL EXAMINATION FOR B.M., CH.B.

Pathology.—T. W. Branch, J. T. Burrowes, N. F. E. Burrows, C. D. Cormac, H. J. L. Dickinson, E. S. Elliott, S. E. Furber, M. W. Hemans, S. J. S. Hughes, F. J. Ingham, S. H. Llewellyn-Smith, J. B. Longmore, J. N. Macdonald, G. K. McGowan, Eileen M. R. McKee, Margaret M. Pickles, R. A. Shawyer, W. A. H. Stevenson, G. D. Walker, G. J. Walley, R. T. Warren, and C. W. M. Whitty.

Forensic Medicine and Public Health.—J. C. G. Abraham, J. M. Almond, J. S. Astbury, J. B. Atkins, T. W. Branch, W. D. Brinton, D. R. Cargill, D. L. P. de Courcy, C. Exell, A. W. Frankland, W. M. Gibson, J. C. Gillett, E. H. Hiley, S. H. Llewellyn-Smith, M. Mandelstam, E. M. Poulton, C. W. R. Rayne-Davis, E. B. G. Reeve, J. Scholefield, A. Shannon, R. G. Silver, M. A. Slee, Celia K. Westropp, R. R. Wethered, and L. L. Whytehead.

Medicine, Surgery, and Obstetrics.—L. B. Bok, R. C. Browne, D. G. W. Clyne, H. J. L. Dickinson, F. G. Ethiraj, T. Gadian, S. R. Gloyne, F. J. Ingham, D. A. Ireland, J. E. Lovelock, H. Muller, C. I. Murphie, H. G. O. Owen-Smith, J. A. Partridge, I. B. Pirie, J. C. Prestwich, C. W. R. Rayne-Davis, R. Roaf, N. Stidolph, C. M. F. Walters, and D. Whitteridge.

Mr. H. L. A. Tarr, of the Rothamsted Experimental Station has been appointed to the Sir William Dunn Institute of Pathology. He is to investigate the chemistry of the bacteria responsible for certain human diseases.

Royal College of Surgeons of England

A meeting of the council was held on Jan. 13th with Sir Cuthbert Wallace, the president, in the chair. The Hallett prize was granted to Mr. B. A. E. Johns, of the University of Birmingham. Mr. W. F. Davis was appointed assistant secretary to the college. It was reported that at the recent primary examination for the F.R.C.S. held in New Zealand 7 candidates out of 14 were successful in passing the examination.

Mr. Hugh Lett was appointed the representative of the college on the council of the Queen's Institute of District Nursing. Mr. W. Sampson Handley was appointed Hunterian orator for 1939, Prof. R. E. Kelly Bradshaw lecturer for 1938, and Sir Humphry Rolleston Thomas Vicary lecturer for 1938.

The following hospitals were recognised for the six months' surgical practice required of candidates for the final fellowship examination: the Royal Hospital, Richmond (resident medical officer and senior house surgeon) and St. John's Hospital, Lewisham (resident surgical officer and house surgeon).

A diploma of membership was granted to D. A. Richmond, of the University of Manchester, and the following diplomas were granted jointly with the Royal College of Physicians of London:

D.P.M.—T. J. K. Brownlees, D. F. Buckle, J. P. Child, H. B. Craigie, A. G. Crisp, Harry Fischgold, W. H. Fraser, Gertrude M. Jefferson, James Littlewood, K. O. Milner, J. D. Richardson, P. H. Sandifer, Mahabir Singh, Pauline W. M. C. Stirling, F. H. Taylor, J. C. S. Thomas, and John Walsh.

D.L.O.—A. S. de B. Cocks, G. S. Dhillon, G. A. M. Knight, H. P. Lawson, and George Phillips.

D.A.—W. E. Brown, A. H. Diamond, Hugh Hunter, Kathleen M. Lyon, Kathleen L. Oldham, and E. S. Rowbotham.

International Congress for Microbiology

The third International Congress for Microbiology will be held in New York from Sept. 2nd to 9th, 1939, under the presidency of Dr. T. M. Rivers. The nine sections of the congress and their convenors are as follows: general biology, variation, and taxonomy (C.-E. A. Winslow); general biology, microbiological chemistry and physiology (Stuart Mudd); viruses and viral disease (W. A. Sawyer); rickettsiæ and rickettsial diseases (Hans Zinsser); protozoology and parasitology (H. W. Stunkard); fungi and fungous disease (B. O. Dodge); medical and veterinary bacteriology (F. P. Gay); agricultural and industrial microbiology (S. A. Waksman); and immunology (M.

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Heidelberger). The general secretary of the congress is Prof. M. H. Dawson, College of Physicians and Surgeons 620 West 168th-street, New York City. Dr. R. St. John-Brooks, Lister Institute, Chelsea Bridge-road, London, S.W.1, is hon. secretary to the British committee.

University of London

Mr. P. G. Scott, chief assistant in the ear department of St. Bartholomew's Hospital, has been appointed to the Geoffrey E. Duveen travelling studentship in otorhinolaryngology for another year.

The Henry Tonks memorial committee has given the university an endowment to provide an annual prize in the Slade School of Fine Art.

Society of Apothecaries of London

The Gillson scholarship in pathology for 1938 has been awarded to Dr. R. H. S. Thompson of the Rockefeller Institute Hospital.

Fellowship of Medicine

A debate on the motion that the law on abortion requires reform has been arranged by the Fellowship and will be held at 1, Wimpole-street, London, W., on Feb. 9th at 8.30 P.M. Sir Beckwith Whitehouse will propose the motion and Dr. W. H. F. Oxley will oppose it. Members of the medical profession and of the Medico-Legal Society may obtain tickets from the secretary of the Fellowship, 1, Wimpole-street, W.1.

St. John's Hospital for Diseases of the Skin, London

Beginning on May 7th the out-patient clinic which is held at this hospital on Saturday afternoons will be held instead on Saturday mornings from 9.30 to 11.30.

Congress of Hepatic Insufficiency

The second Congress of Hepatic Insufficiency will be held at Évian from Sept. 21st to 24th under the presidency of Prof. F. Rathery. Further information may be had from the secretariat of the congress, 138, Avenue des Champs Élysées, Paris, VIII.

British Postgraduate Medical School

On Feb. 2nd, 9th, and 16th at 4.30 P.M. Dr. J. G. Greenfield (and not Dr. Dorothy Russell as stated in our columns last week) will lecture at this school. He will speak on neuropathology: the reaction of nervous tissues to disease. Dr. Russell will lecture at the school on Feb. 23rd, March 2nd and 9th on tumours of the central nervous system and meninges.

Order of the Nile

The King has given Prof. R. S. Dobbin permission to wear the insignia of grand officer of the Order of the Nile which has been conferred upon him by the King of Egypt in recognition of his services in the employment of the Government. Permission has also been given to Major W. L. Forsyth and Major R. J. Rosie to wear the insignia of commander of the order.

Malnutrition and Misleading Advertisements

Addressing the Food Education Society at the annual conference of Educational Associatons held in London on Jan. 6th, Dr. Macpherson Lawrie said that the effort to improve national health was being partially frustrated by "a vast counter-organisation which lives on advertising and encouraging the consumption of manufactured and impoverished foodstuffs." On every side poverty was made the primary excuse for the wide prevalence of malnutrition; yet money that might be spent profitably on valuable food was increasingly enticed into less deserving channels by the sensational claims of uncensored advertisements. Certain food preparations were sound and their method of advertising was justified and reasonable. A public inquiry undoubtedly would be to their advantage because it would remove unwholesome competition. Associated with the artificial food interests were the corrective-drug interests. All the manufactured food preparations were advertised with equal glamour and all promised health; nevertheless the patent-medicine department continued, increasingly, to sell its remedies in every home. Dr. Lawrie asked for some official guarantee of value. The public was in the dark; it could not easily sort the good products from the bad, and in consequence, as often as not, it paid through the chemist's shop the initial tax of ignorance.

Tavistock Clinic

During the week April 4th to 8th Prof. C. G. Jung of Zurich will give four lectures for medical practitioners at the clinic. He will speak on personal and racial factors in the production of the psychoneuroses, on symbolism in organic disorders, and on personal and social prophylaxis of the psychoneuroses. He will also give one public lecture. Further information may be had from the educational secretary of the clinic, Malet-place, London, W.C.1.

Hospitals for Civilian Casualties

The whole of the hospital accommodation of the country is to be surveyed so that arrangements can be made for civilian casualties in the event of an emergency. This will include the clearing hospitals ear-marked by the local authorities under their air raid precaution schemes.

The survey will be undertaken in England by the general inspectors of the Ministry of Health and certain selected medical officers, in Wales by the Welsh Board of Health and in Scotland by the Department of Health for Scotland. The officers have been instructed to confer in the first instance with the medical officers of health concerned and with representatives of the voluntary and other hospitals.

Progress of Housing

In his presidential address to the annual Conference of Education Associations Sir Kingsley Wood, the Minister of Health, said that 3½ million houses had been built in England and Wales since the Armistice. We were also now within measurable distance of achieving the removal of a million persons from the slums to new and good housing conditions. Housing production was still high, and the number of houses under construction at the end of November was 71,620—a new record. One of the most hopeful features of present housing progress was that the number of small houses built for letting was steadily rising. More housing however needed to be done for the countryside. If young people were to remain there and produce families they must be provided with conditions in which they could settle down to a happy, healthy, and comfortable domestic life.

Vacancies

For further information refer to the advertisement columns

Aberdeen University.—Lecturer in Bacteriology, £500–£600.
Auckland Hosp. Board.—Radiotherapist and Radiologist, each £1000.
Bexhill Hosp.—Res. M.O., at rate of £150.
Blackburn, Brockhall Certified Institution for Mental Defectives, Langho.—Deputy Med. Supt., £750.
Blackburn County Borough.—Asst. M.O.H. and Asst. School M.O., £600.
Cardiff City Mental Hosp., Whitchurch.—H.P., at rate of £200.
Cardiff Royal Infirmary.—Res. Surg. O., £200.
Eastbourne, Princess Alice Hosp.—Res. H.S., £150.
Finchley Borough.—Asst. M.O. for Maternity and Child Welfare, 1½ guineas per session.
Gloucestershire Royal Infirmary.—Res. Surg. O., £200.
Godalming, County Sanatorium, Milford.—Jun. Asst. Res. M.O., at rate of £250.
Guildford, Royal Surrey County Hosp.—Hon. Surgeon and Gynæcologist. Also Hon. Surgeon.
Hertfordshire County Council.—Asst. County M.O. and M.O.H., £800.
Hosp. for Sick Children, Great Ormond-street, W.C.—Asst. Pathologist, £400. Cas. M.O., at rate of £175. Also Two Anæsthetists, each 15 guineas.
Hull Royal Infirmary.—H.S. to Ophth. and Ear, Nose, and Throat Depts., at rate of £150.
Ipswich, East Suffolk and Ipswich Hosp.—Cas. O., £144.
Iraq Government.—Obstetrician and Gynæcologist, £150 Dinars per mensem. Also Ear, Nose, and Throat Specialist and General Surgical Specialist, each 120 Dinars per mensem.
Keighley and District Victoria Hosp.—Second Res. M.O., at rate of £120.
King's College Hosp., Denmark Hill, S.E.—Asst. Physician.
Lancaster County Mental Hosp.—Asst. M.O., £500.
Leicester Royal Infirmary.—Part-time V.D. Officer, £350.
Liverpool and District Hosp. for Diseases of the Heart, Oxford-street.—H.P., at rate of £100.
London Chest Hosp., Victoria Park, E.—H.P., at rate of £100.
London County Council.—Asst. M.O.'s for Mental Services, each £470. Also Asst. M.O.'s, Grade I and II, £350 and £250 respectively.
Lord Mayor Treloar Cripples' Hosp., Alton.—Third Res. M.O., at rate of £150.
Maidstone, West Kent General Hosp.—H.P., £175.
Manchester, Ancoats Hosp.—Pathologist and Radiological Officer, each £400. Also Cas. O., £250.
Manchester, Christie Hosp. and Holt Radium Institute, Withington.—Res. Surg. O., at rate of £150.

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Manchester Northern Hosp.—Hon. Asst. Physician for Children.
Mansfield and District General Hosp.—H.S., at rate of £150.
National Hosp., Queen-square, W.C.—H.S., £100.
Persian Gulf, Bahrain Government.—M.O., 1400 Rs. per month.
Plymouth, Prince of Wales's Hosp., Greenbank-road.—H.S., at rate of £120.
Plymouth, Prince of Wales's Hosp., Lockyer-street.—H.S., at rate of £150.
Portsmouth Royal Hosp.—H.P., H.S. to Orthopædic Dept., and Cas. O., each at rate of £130.
Queen's Hosp. for Children, Hackney-road, E.—H.S. and Cas. O., each at rate of £100.
Radium Institute, Riding House-st., W.—Res. M.O., at rate of £420.
Rochdale, Birch Hill Hosp.—Jun. Res. M.O., at rate of £225.
Rotherham, Alma-road Hosp.—Obstet. M.O. and Deputy Med. Supt., £750.
St. Albans, Hill End Hosp. and Clinic, &c.—Third Asst. M.O., £425.
St. Albans and Mid Herts Hosp.—Con. Physician and Con. Surgeon.
St. Leonards-on-Sea, Buchanan Hosp.—Hon. Surgeon.
Sheffield, Jessop Hosp.—Res. Anæsthetist, at rate of £100.
South Eastern Hosp. for Children, Sydenham, S.E.—Hon. Pathologist, £50.
Surrey County Council.—A.M.O., £600.
Tilbury Hosp.—H.S., at rate of £140.
Ventnor, Royal National Hosp. for Consumption, &c.—Second Asst. Res. M.O., at rate of £200.
Wakefield, Clayton Hosp.—H.S., at rate of £200.
Wakefield, Scotton Banks Sanatorium.—Sen. Asst. M.O. and Deputy Med. Supt., £450.
Weir Hosp., Grove-road, Balham, S.W.—Sen. and Jun. Res. M.O.'s, £250 and £150 respectively.
Woking and District Victoria Hosp.—Res. M.O., at rate of £130.
Wolverhampton Royal Hosp.—H.S., at rate of £100.

Specialist Medical Referee under the Workmen's Compensation Act, 1925, for dermatological cases in the Bradford, Keighley, Otley, Skipton, Dewsbury, Wakefield, Halifax, and Huddersfield County Courts (Circuit No. 12), and possibly some other County Courts. Applications should be addressed to the Private Secretary, Home Office, Whitehall, London, S.W.1, before Feb. 7th.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Radstock (Somerset), Cleobury Mortimer (Salop), Fordoun (Kincardine), Callander (Perth), and Dunkeld (Perth).

Medical Diary

January 24th to January 29th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MONDAY.
Odontology. 8 P.M.
Prof. H. H. Stones: Association of Traumatic Occlusion with Parodontal Disease. Mr. Alvan T. Marston: Relation of Deciduous and Permanent Molars in the Ox.
WEDNESDAY.
Comparative Medicine. 5 P.M.
Prof. N. Dungal (Reykjavik) and Mr. E. L. Taylor (Weybridge), Epizootic Adenomatosis, a Lung Disease of Icelandic Sheep. Mr. R. F. Gordon: Rapid Methods of Diagnosis of the Commoner Diseases of Poultry.
THURSDAY.
Urology. 8.30 P.M.
Mr. L. N. Pyrah and Mr. F. S. Fowweather: Renal Calculi, Renal Disease, and Hyperparathyroidism. Mr. A. R. Thompson: The Nervous Element in Urinary Disease.
FRIDAY.
Disease in Children. 5 P.M. (Cases at 4.15 P.M.)
Dr. Alan Moncrieff: Thymic Enlargement in Infants with Special Reference to So-called Status Lymphaticus. Dr. G. Slot and Dr. G. Lynch Burgess: 1. Gargoylism. Dr. Reginald Lightwood and Dr. T. Colver: 2. Nervous Symptoms Ascribed to Kernicterus. Dr. D. Gairdner (for Dr. E. A. Cockayne): 3. Recurrent Lobar Collapse. Dr. Irene Yates: 4. Long-standing Dementia.
Epidemiology and State Medicine. 8.15 P.M.
Dr. Philip Stock: The Use of Some Lethal Gases in Hygiene.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.
MONDAY.—8.30 P.M., Dr. J. C. White (Massachusetts), Sir Thomas Lewis, Prof. E. D. Telford, and Prof. J. R. Learmonth: Recent Advances in Surgery of the Sympathetic Nervous System.

MEDICO-LEGAL SOCIETY.
THURSDAY.—8.30 P.M. (Manson House, 26, Portland-place, W.), Major D. P. Lambert: Some Aspects of Medico-legal Work in India.

ASSOCIATION OF CLINICAL PATHOLOGISTS.
SATURDAY.—9.30 A.M. (St. George's Hospital, S.W.), Communications.

ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS.
FRIDAY.—5 P.M. (London School of Hygiene, Keppel-street, W.C.), business meeting. 6 P.M., Dr. S. W. Fisher: The Health of the Coal-miner. Dr. A. J. Amor: Radiology and Pneumoconiosis. Dr. Fisher, Dr. Amor, Dr. E. R. A. Merewether, Dr. C. L. Sutherland, and Dr. A. Meiklejohn: Demonstration.
SATURDAY.—10 A.M., Visit to Home Office Industrial Museum, Horseferry-road, S.W.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.
FRIDAY.—8.30 P.M. (11, Chandos-street, W.), Prof. A. Bessemans: Experimental Data on Antisyphilitic Hyperthermia produced by Physical Agents.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Thornhaugh-street, W.C.
Fever Hospital Medical Service Group.
FRIDAY.—4 P.M., Dr. E. W. Goodall and Dr. A. Topping: Prevention and Treatment of the Enteric Diseases.

BRITISH PSYCHOLOGICAL SOCIETY.
Medical Section.
WEDNESDAY.—8.30 P.M. (17, Bloomsbury-square, W.C.), Prof. J. E. Marcault: Relationship of Consciousness and the Functional Activities of the Organism.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.
MONDAY.—5 P.M., Mr. W. E. Underwood: Recent Observations on the Pathology of Hydronephrosis.
WEDNESDAY.—5 P.M., Mr. J. I. Munro Black: The Lymphoepitheliomata.
FRIDAY.—5 P.M., Mr. Maxwell Ellis: The Function of the Bronchial Tubes. (Hunterian lectures.)

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland-place, W.
WEDNESDAY.—3.30 P.M., Dr. H. L. Oldershaw: History of Public Health.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
TUESDAY.—4.30 P.M., Prof. Arthur Ellis: Nephritis.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Mr. E. J. King: Hepatic Function and Jaundice. 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Dr. Cuthbert Dukes: Surgical Pathology of Tumours of the Genito-urinary Organs.
THURSDAY.—2.15 P.M., Dr. Duncan White: Radiological Demonstration. 3.30 P.M., Prof. J. Chassar Moir: Anæsthesia and Analgesia.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology).
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and, operations, obstetrical and gynæcological clinics and operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE Hammersmith, W.
MONDAY.—10 A.M.: Dr. H. W. A. Post: X ray film demonstration, skin clinic. 11 A.M., surgical wards. 2 P.M., operations, surgical, and gynæcological wards, medical, surgical, and gynæcological clinics. 4.15 P.M., Mr. Arnold Walker: Obstetric Shock.
TUESDAY.—10 A.M., medical wards. 11 A.M., surgical wards. 2 P.M., operations, medical, surgical, and throat clinics. 4.15 P.M., Dr. Geoffrey Konstam: Rheumatc Heart Disease.
WEDNESDAY.—10 A.M., children's ward and clinic. 11 A.M., medical wards. 2 P.M., gynæcological operations, medical, surgical, and eye clinics. 4.15 P.M., Mr. Harvey Jackson: Surgical Relief of Pain.
THURSDAY.—10 A.M., neurological and gynæcological clinics. Noon, fracture clinic. 2 P.M., operations, medical, surgical, genito-urinary, and eye clinics.
FRIDAY.—10 A.M., medical wards, skin clinic. Noon, lecture on treatment. 2 P.M., operations, medical, surgical, and throat clinics. 4.15 P.M., Dr. V. S. Hodson: Pneumonia.
SATURDAY.—10 A.M., children's and surgical clinics. 11 A.M., medical wards.
The lectures at 4.15 P.M. are open to all medical practitioners without fee.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY.—2 P.M., Dr. W. J. Pearson: Infant Feeding: on the Bottle. 3 P.M., Dr. R. T. Brain: Some Skin Diseases in Infancy.
Out-patient clinics daily at 10 A.M., and ward visits at 2 P.M.

ST. GEORGE'S HOSPITAL, S.W.
THURSDAY.—5 P.M., Dr. E. T. O. Slater: Psychiatric Demonstration.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale W.
THURSDAY.—3 P.M., Dr. Antony Feiling: clinical demonstration.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY.—4 P.M., Mr. J. D. McLaggan: Acute Mastoiditis.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL.
WEDNESDAY.—4 P.M., Mr. A. J. Gardham: Carcinoma of the Tongue.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.
FRIDAY.—4.30 P.M., Dr. A. P. Cawadias: Physical Medicine in Diseases of the Nervous System.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
TUESDAY.—5 P.M., Dr. L. Forman: Sycosis.
THURSDAY.—5 P.M., Dr. G. Duckworth: Erythematosquamous Eruptions. (Chesterfield lectures.)

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY to SATURDAY.—ST. PETER'S HOSPITAL, Henrietta-street, W.C., all-day course in urology (open only to members).—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in dermatology (open to non-members).

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, S.W.
WEDNESDAY.—4 P.M., Col. L. W. Harrison: Gonorrhœa.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY.—4.15 P.M. (Western Infirmary), Mr. W. A. Campbell: Affections of the Hip-joint.

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NOTES, COMMENTS, AND ABSTRACTS

DISEASES RESEMBLING PELLAGRA IN AFRICAN CHILDREN

IN 1926 Dr. R. A. W. Procter, who was working in the Kikuyu Reserve, described [1] a disease seen in quite young children which was almost always fatal. It was characterised by the extraordinarily light colour of the patient, who was usually brought to hospital because of swelling of the feet, and a history of slimy motions was commonly obtained. As the disease progressed the child became paler in colour; there was a curious black desquamation especially at the bends of the elbows and knees, and general œdema was sometimes observed.

In 1933 Dr. Cicely Williams described 20 somewhat similar cases seen on the Gold Coast, with 3 post-mortem examinations. She postulated a nutritional deficiency, but excluded pellagra for various reasons including the distribution of the eruption.[2]

In the following year Dr. R. U. Gillan, unaware of the previous publications, described 12 cases of a mysterious form of fatal œdema occurring in infants in the Kikuyu country. He had 2 necropsies but beyond a fatty condition of the liver nothing abnormal was noted; the children passed large fatty stools, and both hypochromic and hyperchromic anæmia were present. Gillan discussed the relationship of the disease to cœliac disease, sprue, and pink disease, and later several cases were recorded in Kenya and Uganda under the name of Gillan's œdema. On the West Coast the native name of *Kwashiorkor* was applied to it.

Dr. Trowell [3] has published an account of 26 cases observed at the Nairobi Native Hospital and 20 other cases seen in the Kikuyu Reserve hospitals. With 2 exceptions the patients were Kikuyu children between six months and four years old, and as a rule they were brought to hospital about a month after the alleged onset. The early symptoms were irritability, photophobia, a disinclination to stand or run about, some anorexia, and puffiness of the hands and feet. Œdema was nearly always present; in mild cases it was limited to the hands, feet, and face; in more severe cases it was general. The appearance suggested nephritis, but this was negatived by urine analysis. Pyuria was occasionally found. On the disappearance of the œdema before death or on improvement the child was found to be emaciated.

The eruption consisted of jet-black areas of hyperkeratosis very slightly elevated above the surface; they varied in size but by coalescence might involve large areas of the trunk. These patches tended to exfoliate and left pale or pink areas of skin. Generalised loss of pigmentation of the integument was constant, and these pale coffee-coloured children formed a striking contrast to the normal black babies in the wards. The older patches looked as if black varnish had been painted on the skin, and many of them were fissured so that the surface resembled a "crazy pavement"—an apt description used by Dr. Williams.

Angular stomatitis was always found and excoriations were present at the angles of the mouth, around the nostrils and canthi and about the anus and also about the external genitals and scrotum. The hair was always scanty but what remained of it was of a chocolate or coffee colour or even grey and white. It was brittle and had lost its natural curliness. The nails were soft and brittle and ridged lengthwise. The hair and nails recovered with convalescence.

Trowell found the same gastro-intestinal conditions as had been described by Gillian and others. Fatal cases had almost persistent diarrhœa. Hypertonia and hypotonia were observed but it was impossible to make an adequate examination of the nervous system.

Kikuyu children are always breast-fed, usually for a long time, but the breast milk is supplemented by cooked maize at a very early age, the food being masticated by the mother before being given to the infant. Trowell looks upon the condition as being an infantile pellagra and still rather inclines to the zeist hypothesis, and he therefore treated it by diet. Among the 26 patients 9 died (some were admitted in extremis), 5 improved but were taken away by impatient parents before complete recovery, and 10 left hospital free from all signs of illness and did not return. The treatment consisted in the administration of Marmite (one teaspoonful daily for each year of age) with eggs and in severe cases liver. A pint of milk was consumed every day, and a mixture containing iron and calcium lactate was prescribed. Oranges and cod-liver oil were also given but were not thought essential.

Six post-mortem examinations were performed by Dr. F. W. Vint, senior pathologist, at the Nairobi Research Laboratory, and the outstanding feature of the cases was found to be atrophy of the thymus gland—so far advanced that it was sometimes impossible to recognise the thymus at all. (The autopsies were performed within 12 hours of the decease.) The other features were fatty degeneration of the liver and a peculiar smooth transparent condition of the small intestine. The exanthem showed microscopically the features noted by Denton in negro pellagra.

[1] Procter, R. A. W., *Kenya med. J.* 1926, 3, 280.
[2] See Williams, C. D., *Lancet*, 1935, 2, 1151.
[3] Trowell, H. C., *Arch. Dis. Childh.* 1937, 12, 193.

A VARICOSE ULCER SURVEY

THE very frequency of varicose ulcers seems to have stifled interest in them, and in some countries the disinclination of certain surgeons to admit sufferers to hospital is as notorious as it is deplorably excusable. Hitherto scant attention has been paid to varicose ulcers as a social problem of enormous but ill-defined dimensions. To make good this omission the Danish Medical Society gave it the place of honour at its annual meeting in 1937. They had set Dr. Kaj Roholm the task of undertaking a social survey, the findings of which he presented at the meeting.[1] His figures refer to all forms of ulcus cruris, but the syphilitic, tuberculous, diabetic, and arterio-sclerotic lesions in the lower part of the leg were numerically negligible. The material studied consisted of illustrative samples. One sample was of the 578 cases treated at the Rudolph Bergh Hospital in Copenhagen in the 5-year period 1931–35; another was the 263 patients whose claims to sickness benefit were settled by law; a third, the 337 patients who belonged to a friendly society and who, in 1936, were notified as suffering from ulcus cruris. Out of this total of 1178 patients, as many as 856 were women—a sex ratio the opposite of that given by many text-books. Yet another sample consisted of the 7520 cases treated in the hospitals of Copenhagen and Frederiksberg in the 35-year period 1901–35; in this group also the women greatly outnumbered the men. In the first five years of this period, the average number of cases per year was only 140, whereas in the second it was 316—a rise giving the lie to the at least premature assumption that the injection treatment of varicose veins and certain other factors have begun to stamp out these ulcers.

On the basis of his figures, Dr. Roholm calculates that Denmark, with a population of 2·8 millions above the age of 14, has every year to cope with 10,000 to 15,000 cases severe enough to justify sickness benefit. In frequency, therefore, this disease ranks with pulmonary tuberculosis and cancer. But while the mortality from ulcus cruris under hospital treatment is only between 1 and 2 per cent.—among the series of 7520 hospital-treated cases there were 107 deaths due to causes directly connected with the

[1] *Hospitalstidende*, Nov. 9th, 1937, p. 23.

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ulceration—and the whole may be put at only about 0·5 per 100,000, the corresponding figure for pulmonary tuberculosis must be somewhere between 40 and 80, and for cancer at about 150. This comparatively low mortality for varicose ulcer is of course comforting, but it must be balanced against its chronic and relapsing character. Dr. Roholm calculates that about 40 per cent. of the patients belonging to his first three samples had suffered for 5–20 years, and 27 per cent. for 20 years or more. He considers it one of the worst afflictions that can overtake anyone obliged to earn his living by bodily toil, and he paints a sad picture of the sufferings of these patients by night as well as by day. He estimates the cost to the community at about 2 million kroner a year. He concludes with suggestions for the improvement of this state of affairs, and among prophylactic measures he gives place of honour to energetic treatment of varicose veins. Another useful step would be an educational campaign encouraging patients to seek medical advice early, instead of first exhausting all the therapeutic ingenuity of home advisers and quacks.

DIPHTHERIA IN LYONS

Dr. Marie-Rose Lyathaud says that diphtheria, which was formerly rare in Lyons, became permanently installed there in endemo-epidemic form about the year 1880 (Thèse de Lyon, 1936–37, No. 188). Since the introduction of active immunisation the incidence has shown a decline, especially in quarters where inoculation has been compulsory. The fatality-rate has also shown a considerable fall thanks to antitoxin and general prophylactic measures. It is chiefly however since 1930 that the death-rate has diminished and the milder course of the disease has coincided with the introduction of active immunisation which is being employed on an increasing scale. Children still form the part of the population most affected by diphtheria, but whereas the fall of the incidence of diphtheria in childhood has been very pronounced since 1925, thus indicating the benefit derived from anatoxin (toxoid), the morbidity in adults during the same period has increased.

TEA FOR BURNS

THE use of ointments and of oily preparations such as carron oil in the first-aid treatment of burns has the serious disadvantage of complicating the application of tannic acid later. Peiris [1] suggests that every household has at hand in the family tea-pot the apparatus for preparing a suitable tannic-acid solution in an emergency, and that its employment is simple in the extreme. The proportion of tannic acid varies in different teas, an average black tea containing about 16 per cent. and a green 27 per cent., and the amount of this which passes into an infusion is also very variable, about 7 per cent. being extracted after five minutes and 16 per cent. after forty minutes infusing. In burns Peiris advises the infusion of six teaspoonsful of black tea in six teacupsful of boiling water for ten minutes. The tannic-acid content of this must be very low, but Peiris says it is effective. Four layers of clean handkerchiefs or sheeting are put to soak in the tea, and while it is cooling the clothing is cut away to expose the burnt parts. The tea compress is then applied direct to the burnt area and covered with a light bandage. Peiris uses a similar method at the Colombo General Hospital. There the parts are first cleaned with ether and blisters are cut away under morphia or an anæsthetic, and then six layers of gauze soaked in a fresh tea infusion containing acriflavine 1 in 1000 are applied and kept moist with tea for twenty-four hours. Unless there are signs of gross sepsis the dressings are left on for 12–14 days. The usual measures are taken to combat shock and toxæmia. Peiris describes 12 patients whom he has treated, 6 having extensive third-degree burns. In his early cases the applications consisted of compresses of moist tea-leaves from the ward pot, and later of lint soaked in tea prepared in the ordinary way in the ward. The burnt areas are said to have healed as rapidly as would have been expected with orthodox tannic-acid treatment, and there were no deaths. Though this method has obvious advantages as first-aid in the home, most hospital surgeons would prefer to have their tannic-acid solutions prepared in the dispensary rather than in the kitchen.

[1] Peiris, M. V. P., *Indian med. Gaz.* 1937, 72, 718.

THE LIFE AND DEATH OF MOK

MOK, the late lamented male gorilla at the London Zoo, came with his female companion, Moina, from the French Congo in 1932. At that time they had both been in captivity over two years and had been well cared for by a local district commissioner, M. Capagorry, and his wife.

At this time Mok was about 3½ years old and Moina two years older. Both were tame up to a point, especially with Madame Capagorry, with whom they played for an hour or more every day. They were not found together but in different localities in the French Congo and at different times. Mok was a typical lowland gorilla (*Gorilla gorilla gorilla*), whereas Moina probably came from farther inland and is intermediate in form between the lowland type and the Kivu gorilla of the Belgian Congo (*Gorilla gorilla beringei*). The male of the latter species grows to a much greater size and weight than the lowland form. Mok, at his best last summer, weighed 320 lb. and Moina 252 lb., although when first brought to the Zoo in 1932 he weighed only 70 lb. against Moina's 112 lb. An adult male Kivu gorilla died at the Berlin Zoo last year, weighing 568 lb. Had Mok lived he would have probably never weighed more than 400 lb.

Although he had the appearance of being immensely strong and healthy, he was never so resistant to disease as Moina and he had two attacks of pneumonia, the first in the winter of 1932 and again a year later. During the first of these attacks it was possible to examine Mok and to percuss and auscultate his chest in the usual manner, as he was still in the approachable stage, but by the following winter, when he had his second attack, this was not so easy. By that time both gorillas had been transferred to the new house which was specially built for them and had become so rough in their play that even their keeper could not go in with them. It is interesting to note that the first attack of pneumonia which Mok had was definitely lobar in type and unlike the usual broncho-pneumonia of young chimpanzees, which resembles the broncho-pneumonia of children.

The following list gives an idea of the varied diet which is necessary to keep a gorilla in health in captivity.

	Per week.		Per week.
Grapes	14 lb.	Porridge	¼ lb.
Bananas	42	Tea	2 oz.
Apples	14 lb.	Sugar	2½ lb.
Oranges	21	Bread	3½ hf.-qtns.
Prunes	2 lb.	Butter	6 oz.
Rhubarb (when in season)	3½ bdls.	Eggs	10
Tomatoes	2 lb.	Milk (condensed)	3 tins.
Lettuces	6	Milk (tubercle-free, irradiated)	7 quarts.
Greens	5 lb.	Cod-liver oil cream	About ½ pint.
Onions	2½ lb.		
Carrots	1½ lb.		

In addition to the above, Mok and Moina used to get a boiled chicken once a week, and sugar-cane, corn-cob, melons, cucumbers, and other delicacies when in season. They also had products rich in various vitamins. The cost to the Zoological Society of keeping this pair in food alone was at least £4 per week.

The special house which was designed by Messrs. Tecton is considered to be one of the most ingenious

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and modern of all animal-houses. It is arranged in such a way that during the winter half of the circular house is reserved for the animals and half for the public, direct contact with the public being prevented by a movable screen of glass in addition to the bars of the cage. The glass, of course, is to prevent direct infection from visitors and improper feeding. During the summer, in addition to this interior cage, the animals are given the other half of the house which the public use in the winter time, and the visitors then look on from outside, being separated from the outside cage by a barrier 8 feet away from the bars of the cage. At this distance any infection is absent, or at any rate so attenuated as to be negligible.

The first signs of illness in Mok were noticed at the beginning of November last, when he lost his appetite and became listless. These symptoms increased until Christmas time when a slight improvement was noticed. This improvement, however, did not last and by the beginning of the New Year he was refusing all solid food and taking very little in liquid form. Owing to his strength and truculence, it was impossible to examine him in any way or even take his temperature, and apart from a certain amount of loss of weight and occasional diarrhœa he had no other symptoms of disease except that when he could be induced to open his mouth to take a drink, it appeared to be somewhat inflamed and injected. During the ensuing fortnight there were days when he seemed to rally and take a little more nourishment, while on other days he lay listless and refused even water. The question of giving him an anæsthetic for purposes of examination was considered, but was held not to be expedient owing to certain obvious difficulties in catching up the animal, with resulting exhaustion, and also because of slight lung symptoms which towards the end made themselves apparent. Mok died at 7.30 P.M. on Jan. 14th. The body was transferred immediately to the prosectorium and opened up in order to prevent decomposition. During that night, the brain was removed and injected and certain other organs, such as the testicles, were preserved for research purposes.

A very full post-mortem examination was made by Colonel A. E. Hamerton, pathologist to the Zoological Society. The findings post mortem were surprisingly few, and macroscopically it could not be said that anything could be found sufficient to cause death, the only obvious changes being some fatty degeneration of the liver and some changes in the cortex of the kidneys. A full microscopical examination of the tissues is being undertaken and also cultures have been taken from the blood. It is possible that the results of these may throw more light on the cause of Mok's illness and death.

G. M. V.

THE HOSPITAL DIARY (Messrs. Frederick Aldridge, 34, Paternoster-row, London, E.C.4) is designed for the use of house governors, matrons, pharmacists, and almoners. Adequate space is provided for the day's engagements, and the general information in front of the diary should prove a real stand-by to all engaged in hospital administration. At the end is a useful guide to hospital buyers. The price is 5*s*.

THE SERVICES

ARMY DENTAL CORPS

THE War Office announces vacancies for commissions in the Army Dental Corps. Candidates will be selected with competitive examination; they must be under 28 years of age and must be registered under the Medical Acts or Dentists Acts. Those selected will be given short-service commissions for six years, after which they will retire with a gratuity of £1000 unless they are granted permanent commissions. Further particulars appeared in our advertisement columns last week.

Appointments

BAKER, ALFREDA, M.D. Belf., F.R.C.S. Eng., Hon. Assistant Surgeon to the Elizabeth Garrett Anderson Hospital.

BUTTLE, R. L., L.R.C.P. Lond., Third Assistant Medical Officer at the West Sussex County Mental Hospital, Chichester.

EDWARDS, COLIN, M.B. Sydney, M.R.C.P. Lond., D.P.M., Assistant Physician to the Miller General Hospital, Greenwich.

ELLIOTT, W. A., M.B. Camb., M.R.C.P. Lond., Medical Registrar at the West London Hospital.

HARRISON, T. H., M.B. Sheff., D.P.H., Senior Assistant Medical Officer, School Medical Service, Plymouth.

HARRISON, T. H., M.B. Sheff., D.P.H., Chief Assistant County Medical Officer of Health for Cambridgeshire.

HILL, GLADYS, M.D. Lond., F.R.C.S. Eng., M.C.O.G., Hon. Assistant Obstetric Surgeon to the Elizabeth Garrett Anderson Hospital.

HOVELL, J. H., M.R.C.S. Eng., L.D.S., Chief Assistant to the Dental Department at St. Bartholomew's Hospital.

O'MALLEY, E. E., M.B. Dubl., Casualty Officer and Surgical Registrar at the King George Hospital, Ilford.

POTTER, C. T., M.D. McGill, M.R.C.P. Lond., Physician to the Children's Department of the West London Hospital.

POTTER, L. S., M.B. Manch., Assistant Secretary of the British Medical Association.

RALSTON, MARGARET M. R., M.B. Edin., Assistant Medical Officer at the Lancaster Mental Hospital.

RENNIE, J. L., M.B., F.R.F.P. & S. Glasg., D.P.H., Assistant Medical Officer for Ayr and Resident Medical Officer at Heathfield Hospital.

STRAUSS, E. B., D.M. Oxon., M.R.C.P. Lond., Physician to the Psychological Department at St. Bartholomew's Hospital.

Colonial Medical Service.—The following appointments, promotions, and transfers are announced:—

ALLEN, G. T., M.R.C.S. Eng., Medical Officer, West Africa;
CLARKE, J. H. C., M.B. Glasg., Medical Officer, Somaliland;
INNES, J. R. S., M.B. Belf., Medical Officer, West Africa;
LANCELEY, J. L., M.B. Liverp., Medical Officer, Uganda;
PATRICK, M. S., M.B. Belf., Medical Officer, West Africa;
DEALE, J. E., M.B. Dubl., F.R.C.S. Irel., Senior Medical Officer, Gibraltar; and
HENDERSON, J. A., M.B. Edin., D.T.M. & H., Senior Medical Officer, St. Vincent.

Births, Marriages, and Deaths

BIRTHS

BELL.—On Jan. 12th, at Uckfield, Sussex, the wife of Dr. Derek Bell—a son.

FOWLER.—On Jan. 9th, the wife of Dr. A. Francis Fowler—a daughter.

HENDERSON.—On Jan. 9th, the wife of Dr. F. Y. Henderson, Wimbledon, S.W.—a daughter.

HOLMAN.—On Jan. 11th, at Finchley-road, N.W., the wife of Dr. Geoffrey Holman—a daughter.

MURRAY.—On Jan. 14th, at Exmouth, the wife of Mr. J. Douglas Murray, F.R.C.S.—a son.

MARRIAGES

MCMANUS—WADDELL.—On Dec. 28th, at Gwelo, Southern Rhodesia, Thomas S. McManus, M.B., to Elsie Norah, youngest daughter of the late R. D. Waddell, of Ealing.

MOFFETT—LAING.—On Jan. 15th, at Moseley, Arthur James Moffett, F.R.C.S., to Isabella Murray, second daughter of Mr. Murray Laing, of Barnt Green.

MULLIGAN—CHAMBERLAIN.—On Dec. 30th, in Capetown, Bernard Joseph Mulligan, L.R.C.P., of Roscommon, Ireland, to Joan Katharine Chamberlain, of Iron Acton.

PARBURY—SALE.—On Jan. 5th, at Frogmore, W. K. Parbury, M.R.C.S., D.M.R.E., of Bedford, to Miss Muriel Sale.

THORNE THORNE—HARRIS.—On Jan. 15th, in London, Vernon Thorne Thorne, M.B., Colonial Medical Service, of Woking, to Edna Harris, of Redcar.

DEATHS

ANDREWS.—On Jan. 16th, at Norwich, Charles Horace Andrews, L.R.C.P. Edin., in his 76th year.

BRENAN.—On Jan. 11th, at Tonbridge, Kent, Alexander Richard Micklethwait Brenan, M.D. Camb., son of the late Canon Brenan, of Clifton, Bristol.

GIDLEY.—On Jan. 15th, at Cullompton, Devon, Gustavus George Gidley, M.R.C.S. Eng., L.S.A., aged 76 years.

GOTT.—On Jan. 17th, at Emsworth, Hants, Jeffrey Gott, L.S.A. Lond., late Surgeon, Orient S.N. Co.

MATHESON.—On Jan. 17th, at Plockton, Ross-shire, John Matheson, M.D. Aberd., aged 81.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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ADDRESSES AND ORIGINAL ARTICLES

ORIGIN AND SPREAD OF CANCER OF THE RECTUM

IN RELATION TO SURGICAL TREATMENT *

BY SIR CHARLES GORDON-WATSON, K.B.E., C.M.G., F.R.C.S. Eng., F.A.C.S.

CONSULTING SURGEON, ST. BARTHOLOMEW'S HOSPITAL, ST. MARK'S HOSPITAL FOR DISEASES OF THE RECTUM, AND THE METROPOLITAN HOSPITAL, LONDON

Sir James Paget observed "that it would be very interesting if we could tell the time and manner of first appearing in the case of many diseases," and he adds "but it is scarcely ever possible." If he could have looked forward 50 years how interested he would have been to see the progress that has now been made in this direction.

Earliest Stages

There is considerable evidence to show that in the large intestine hyperplasia→adenoma→carcinoma is a common sequence of events, and it is open to doubt if an epithelial tumour in this region is ever malignant in its earliest stage.

I shall demonstrate the origin of malignant disease both in a small sessile adenoma—i.e., an overgrown patch of hyperplasia (Fig. 2)—and also in a pedunculated adenoma, but I can produce no specimen of early malignancy in a portion of mucosa which shows no other evidence of hyperplasia. I think it is not unreasonable to assume that cancer does not develop in this area without evidence of prior hyperplastic change. Sir William Savory, in his Bradshaw lecture on the pathology of cancer in 1884, was far-seeing when he observed "that the transition from a local hyperplasia to a distinct tumour is not a very abrupt one," and in comparing innocent and malignant tumours observed that "these two great classes often approach very closely and sometimes pass into each other."

In the earliest stages cancer of the rectum begins as a proliferation of epithelium, protruding to a greater or lesser extent into the lumen whether the malignant process commences in a level portion of mucosa, if it ever does, in a patch of hyperplasia, or in a sessile or pedunculated adenoma. The amount of surface proliferation varies greatly in different cases, and is dependent chiefly on the degree of deep infiltration, which leads to a complete transformation in the general contour of the tumour.

The surface of the growth enlarges by marginal increase and its depth increases by infiltration. When infiltration commences, growth is more extensive in the submucosa than on the surface, so that the growing edge of the tumour becomes undermined and elevated. This is followed by the formation of root-like projections which push their way between segments of the circular muscle. By the time the growth has reached the muscle, ulceration has usually commenced opposite the point of deepest infiltration. This is due to interference with the surface blood-supply and is accelerated by local sepsis.

Classification of rectal cancer into protuberant and ulcerating is apt to be misleading, since these are not different types but different stages. Some tumours may infiltrate and ulcerate before they have grown far on the surface, while others may extend rapidly on the surface before marked infiltration occurs. No constant relationship exists between the extent of surface growth and the extent of deep infiltration. A protuberant malignant growth completely surrounding the bowel may sometimes be limited to the submucous coat, while a growth involving only a small area on the surface may grow downwards rapidly, ulcerate early, and infiltrate the perirectal tissues (Gordon-Watson and Dukes 1930).

In the condition known as polyposis intestini (adenomatosis), which is generally a familial disease occurring in young people, it may be stated that malignant disease invariably completes the picture in those that fail to succumb from repeated hæmorrhages or have not been saved by total colectomy. Many members of the families so afflicted, when traced, are found to have died from malignant disease of rectum or colon, usually at a comparatively early age, and it is reasonable to assume that they have been victims of multiple polyposis in the first instance. These families tend to die out from malignant disease, as shown by the family trees published by Jungling (1928), Zahlmann (1903), Lockhart-Mummery and Dukes (1928), Dukes (1930), and others. I have removed the colons of a brother and sister who suffered from this complaint. In one of them a malignant growth was found, though not recognised before operation.

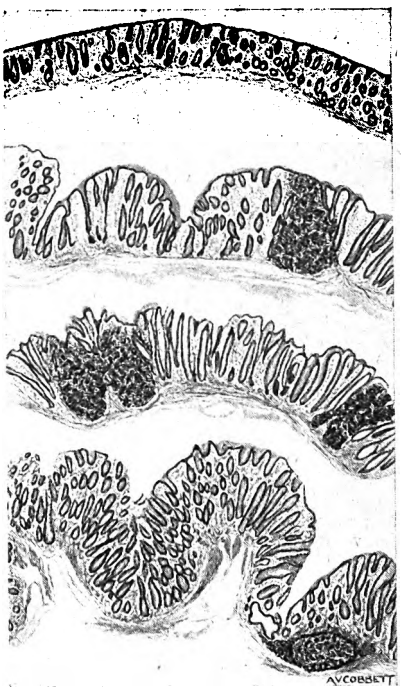

FIG. 1.—Strip of mucosa removed from the neighbourhood of a carcinoma of the rectum showing the stages of hyperplasia.

It is only to be expected that localised as distinct from diffuse adenomatosis should show the same tendency to transition from innocent to malignant, and there is abundant clinical and pathological evidence in support of this. Multiple malignant tumours of the rectum or colon are occasionally met with but they are seldom found without the coexistence of adenomata. In 100 consecutive excisions Gabriel found 8 instances of two growths.

Dukes (1932) has shown that either visible adenomata or minute hyperplastic nodules, which only become evident on stretching the mucosa, are found very often around an early cancer of the rectum, though less frequently in advanced cases; Wood and Wilkie confirm this (1933).

This seems to suggest, when malignant disease occurs, that there is a wide area of mucosa which is vulnerable to hyperplastic change (Fig. 1). I have

* Bradshaw lecture delivered at the Royal College of Surgeons on Dec. 2nd, 1937.

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on a few occasions after dealing with a very early growth by local measures, either by surgery or radium, had the unhappy experience of seeing another malignant tumour develop in a different situation though not far off, which suggests that the whole area is potentially malignant, and that the removal of one malignant tumour may stimulate further malignant change. There is experimental evidence in connexion with tarring of mice to support this view. If we can accept this theory then a local removal as distinct from resection for even very early growths seems to be contra-indicated. It requires, however, some courage to advise radical surgery for a small malignant adenoma.

In a number of instances after radical excisions of the rectum I have met with the development of growths in the colostomy stump or higher up in the colon sometimes many years later, and it is not uncommon to meet with adenomata in the pelvic colon and sometimes even an early carcinoma when a colostomy is carried out as a preliminary to excision of a malignant growth of the rectum. In three consecutive cases of growth in the rectum during the past year, when performing a colostomy as a preliminary to perineal excision, I found a growth in the pelvic colon. In one instance both growths were malignant, in another both proved to be innocent, and in the third case there was a malignant growth in the rectum and an innocent one in the colon.

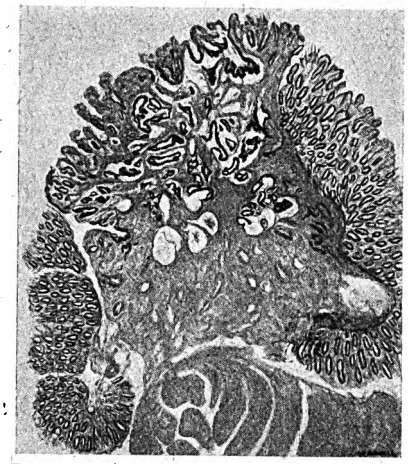

FIG. 2.—Earliest stage of adenocarcinoma developing in an adenoma (diameter of tumour at the base, 2 cm.).

I venture to think that the sequence of events which I have described is the correct picture of the onset of cancer of the rectum.

Spread

The valuable work of Dukes and Bussey at St. Mark's Hospital has done much to advance our knowledge of the classification and spread of rectal cancer. By careful investigation of every excised rectum in a long series of cases (now well over 700) they have been able to establish a system of anatomical classification that provides a general rule of great value in prognosis and, by inference, of much help to the surgeon in assessing the value of operative procedure for different stages of the disease under varying conditions. Unfortunately this classification cannot be established before operation, though it can be inferred to some extent by the presence or absence of ulceration, the degree of mobility or fixation, and the past experience of the surgeon.

When the growth is confined to the submucosa and muscular coat, and has not yet penetrated into the perirectal space, the disease is purely local. These are classified under the heading of A cases. Unhappily these cases form the minority of those operated on (15 per cent.).

As soon as the growth has infiltrated through the rectal wall and invaded the perirectal tissues, the menace of lymphatic spread is imminent. Fortunately it is often found that infiltration has occurred into the perirectal tissues and sometimes to a considerable degree without invasion of the regional lymphatics. Growths under this heading are classified as B cases and represent 35 per cent. of cases treated by excision.

In the specimens examined at St. Mark's infinite pains are taken to establish the full extent of the spread of the disease by careful dissection and by serial sections, and although the general rule must be accepted that lymphatic spread does not occur until the growth has broken through the rectal wall, a few exceptions have been met with, but these instances do not represent more than 1 per cent. It may well happen that even in these exceptional cases the growth has pierced the wall at some small point that has not been detected.

FIG. 3.—Radiogram of excised rectum opened up along the midline in front. The diffuse black area is due to a well-differentiated columnar cell carcinoma, which is in the centre of the opaque area. Note the large number of normal lymphatic vessels (the thin lines) coming from the region of the ulcer, and passing to the pararectal glands which are seen as dark ovals. Some of the largest of the glands contain secondary deposits (Dr. J. H. Gray).

LYMPHATIC SPREAD

When lymphatic spread has occurred statistics of perineal excisions show that however extensive the

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surgical procedure the odds against a patient surviving for five years are 5 to 1.

When the lymphatic glands become involved the disease has ceased to be localised. and these cases are classified as C. They form the largest class and no less than half the excisions investigated show evidence of lymphatic invasion. This percentage agrees with the figures of Wood and Wilkie (1933) and also of McVay (1922) of the Mayo Clinic, who have both investigated a series of 100 excisions.

Dr. J. H. Gray, working at St. Bartholomew's, has injected specimens of cancer of the rectum immediately after removal with Thorotrast and demonstrated the upward spread to the glands (Fig. 3). He has not produced evidence of permeation by this method.

It sometimes happens that, after a perineal excision, it is found on histological investigation that metastasis has occurred in glands up to the level of, or above, the point of ligature of the inferior mesenteric (or superior hæmorroidal), so that the presumption is that the disease has not been completely eradicated, and this happens also, though less frequently, when a combined operation has been carried out. These cases have been labelled C_2, as distinct from C_1, when the level of glandular spread has stopped short of the site of ligature of the main artery and the glands nearest to the severed vessel are free from secondary deposits. Records of C_2 cases have not been kept for a long enough period to enable a comparison between C_1 and C_2 in rate of survival, but the C_2 cases surviving for 2 years are in the minority. Figs. 4 and 5 illustrate the operability rate, the relative proportions of A, B, and C cases as found after excision with their life lines, and the survival rates for these three groups.

In every case the regional nodes lying against the deep surface of the growth or just above it are invaded in the first instance, and then invasion follows the glands along the superior hæmorrhoidal vessels upwards, usually in an orderly manner, to the inferior mesenteric group, although very occasionally it happens that one or two glands escape when others higher up are involved, or that the glands just above the growth are attacked while those lying against the deep surface escape.

In advanced cases beyond the reach of surgical cure, when the superior hæmorrhoidal and inferior mesenteric nodes are obstructed by extensive metastases, cancer cells may then be found in the middle hæmorrhoidal area, and when this happens the iliac glands ultimately become involved. In growths low down in the rectum, when the upward path is obstructed by extensive metastases, downward spread into the ischiorectal fossa has very occasionally been met with which may spread along the inferior hæmorrhoidals to the inguinal glands. Save in these advanced and exceptional cases a lateral or downward lymphatic spread is so rare as to be negligible.

There is no tendency for lymphatic invasion to spread from the inferior mesenteric chain, against the lymphatic current, along the paracolic vessels which drain the pelvic colon; although, as just mentioned, when the lymphatic spread upwards along the inferior mesenteric has reached the point of saturation, at a stage of the disease when radical surgery is either no longer feasible or offers little hope of cure, cancer cells do occasionally invade the the paracolic glands, and of course when the growth is so high up in the bowel that the paracolic vessels drain some portion of it, metastasis may be found in these.

Gabriel, Dukes, and Bussey (1935) carried out a very careful investigation of 100 excised rectums and examined over 2000 glands. In 62 of these cases they found lymphatic metastasis. In only half were four or more glands invaded, and in rather less than a quarter only one gland was involved. Every gland found was sectioned, and in some cases as many as 60 glands were found, the average number being 28. Only once, in a very advanced C_2 case, in which 18 out of 30 glands were invaded, was metastasis found in a paracolic gland.

These figures suggest that glandular metastasis usually progresses at a slow rate and encourages the surgeon to attack growths that are obviously advanced, because he knows that even though lymphatic invasion has begun there is more often than not a considerable time lag before dissemination has gone beyond the limit of radical excision.

VENOUS SPREAD

In considering the spread of the disease vascular invasion must be kept in view, and all specimens at St. Mark's are now examined for the presence of cancer cells in the superior hæmorrhoidal veins. We occasionally find evidence of thrombosis and malignant invasion in a regional vessel and yet no evidence of glandular invasion, though in some cases there is permeation of the perivenous lymphatics. When early venous invasion occurs, it must be regarded as an accident due to the growth invading the vein.

It is clear from the high survival rates of early cases without lymphatic spread that venous metastasis does not often precede lymphatic invasion, but on very rare occasions an undetected metastasis in the liver, in an early case, is a factor which upsets statistics. In a young patient with a growth well within the range of radical surgery—usually button-like and on the posterior wall—I have more than once met with metastasis in the liver at the time of colostomy. No doubt venous emboli can and do occasionally occur in the early stages of the disease, and this is one uncertain factor that the surgeon has to face when considering prognosis. It is possible also that manipulations during operation may be responsible sometimes for the separation of a thrombus and so cause metastasis, especially when the growth is advanced and adherent.

The difference between the survival rates of the A and B cases after operation, which for the five-year period at St. Mark's are 91 and 64 per cent. respectively, having regard to the fact that there is no evidence of lymphatic spread in either, can for the most part be explained by the greater liability of the B cases to venous spread. In other words, a few cases that escape lymphatic spread become victims of venous invasion before there is extensive extrarectal spread, and die from metastasis in the liver.

OTHER FACTORS INFLUENCING THE SPREAD

The varied and more or less indeterminable factors of resistance are but little understood. Paget said that "changes in the external conditions of our life have influence on even those morbid conditions which are most personal," and there is no doubt that variations in the rate of growth and spread of malignant tumours of the rectum depend on extrinsic factors as well as intrinsic. Clinical experience leads me to believe that factors, outside the disease in question, that lower the general resistance are often responsible for the onset of unexpected recurrences in patients who have seemed to pass the danger-point and have steadily improved, or have continued on an even keel up to the time of an attack of influenza or some

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other physical or mental distress that lowers vitality.

Histological grading of rectal tumours, as described by Broders (1925) of the Mayo Clinic, is a useful guide to the activity of a growth and so to prognosis, although a biopsy is not always reliable because the growing edge of the tumour usually shows less differentiation than the main mass. The tumours are divided into four grades according to the degree of differentiation. Grade 4 is the most malignant and happily rare. Half the cases fall into Grade 2, about a quarter into Grade 3, and the remainder are mostly colloid growths, with a few Grades 1 and 4. The survival rate for each of these types, as might be expected, varies directly as the degree of malignancy, and the figures fall into line very closely with the end-results based on anatomical classification.

Relation to Surgical Treatment

For many years there has been considerable controversy about the ideal methods for radical treatment of malignant disease of the rectum. If the conclusions arrived at from the investigations at St. Mark's on a series of over 700 excisions are accepted, we are in possession of a sound pathological basis on which to build surgical treatment.

Some 30 years ago dissatisfaction with the high rate of recurrence following methods of excision from below stimulated surgeons in this country, notably Ernest Miles (1926), to develop the combined abdomino-perineal method. To develop and perfect the technique of a new and complicated operation takes time, and in the process so many patients lost their lives from the severity of the operation, often when a permanent cure might have been expected had they survived, that many surgeons shrank from exposing their patients to so severe a risk. This stimulated Lockhart-Mummery and others to develop improvements in the technique of the perineal operation which they employed for the majority of cases, reserving the combined operation for those unsuitable for the perineal. Side by side the practice of these two methods has developed and progressed until, with the aid of advances in anæsthetics, improved pre-operative measures, blood transfusions, and increased experience, both operative mortality and end-results have vastly improved. Great credit is due both to Ernest Miles and to Lockhart-Mummery and their followers for the advances made.

Those who employed the combined operation for growths in all situations, to the exclusion of other methods, based their practice on the supposition that the lymphatic spread of this disease occurred in upward, lateral, and downward directions. Research at St. Mark's has shown, as I have indicated, that such a state of affairs occurs only in the most advanced cases that are beyond the reach of radical surgery, and that for all practical purposes the only spread is upwards. With this knowledge and the fact that there is no lymphatic spread until the growth has penetrated the muscular coats and perhaps not till some time after this, the surgeon can plan his method of excision according to the situation of the growth and to the stage that the disease has reached, provided that he can estimate this on clinical grounds.

In the light of our present knowledge of the spread of the disease the type of operation should depend on whether the growth is entirely below the peritoneum, partly above and below, or entirely above, as well as whether the disease is still a local one or has spread to lymphatic channels. From our knowledge of the development of the disease we know that in many instances the mucosa of the rectum in the neighbourhood of a cancer, perhaps for some distance up, is in a state of unrest and prone to hypertrophy and proliferation, a condition that suggests a precancerous state, so that it is no easy matter for the surgeon to decide when operating to what extent he should be influenced by these factors in planning his excision. Those who advocate a combined operation for low growths, which can be removed with greater safety by a perineal excision, can find some support for their practice if they regard a wide vulnerable area as a genuine danger. Without doubt risks are run if multiple adenomata are left behind, and it may well happen that this is the case even after an extensive combined operation.

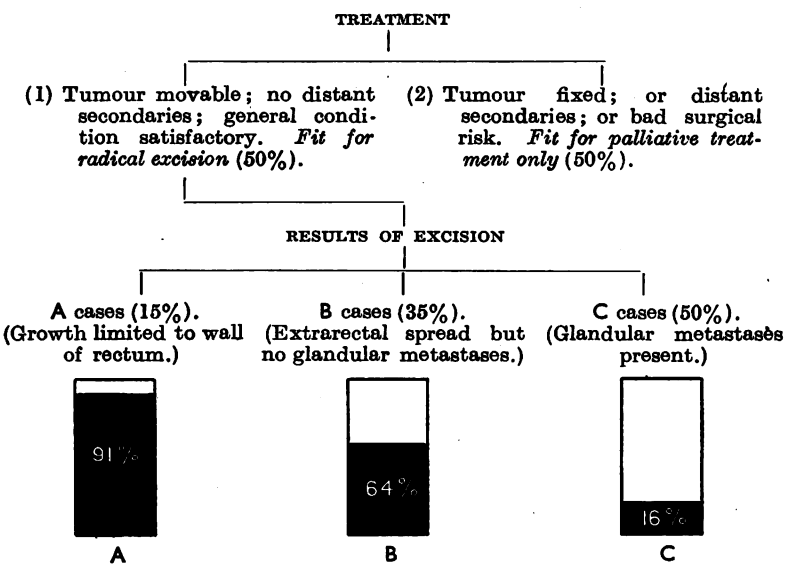
TREATMENT
(1) Tumour movable; no distant secondaries; general condition satisfactory. *Fit for radical excision* (50%).
(2) Tumour fixed; or distant secondaries; or bad surgical risk. *Fit for palliative treatment only* (50%).
RESULTS OF EXCISION
A cases (15%). (Growth limited to wall of rectum.)
B cases (35%). (Extrarectal spread but no glandular metastases.)
C cases (50%). (Glandular metastases present.)
91%
64%
16%
A
B
C

FIG. 4.—Five-year survivals after perineal excision.

CASES WITH LITTLE OR NO FIXATION

Early growths below or partly above the reflexion.—There is no doubt in my mind that all growths below the peritoneum that are reasonably early and mobile should be removed by the perineum rather than by a combined method, or else by a sacral resection-anastomosis in selected cases. Those that are partly above and partly below can in many instances be dealt with in the same way provided that they are not advanced, that it has been ascertained at a preliminary laparotomy that there is no lymphatic spread, and that the pelvic colon is long enough to allow of a high division from below. It is true that for these cases the combined operation, either perineo-abdominal or abdomino-perineal, is easier and in some instances more radical, but the operative mortality is probably about double. Some early cases in this situation can safely be treated by one of the combined methods of conservative resection which I shall refer to later.

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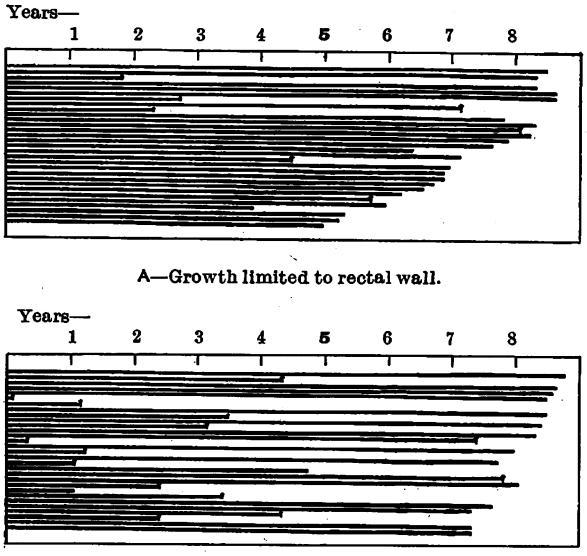
Early growths entirely above the reflexion.—When the growth is entirely above the peritoneal reflexion and there is a reasonable margin of normal bowel below, there are no arguments, based on sound pathology, for removing the rectum below the peritoneum. These cases can best be dealt with by means of the Hartmann operation with quite a low operative mortality, and with all the advantages that the combined operation gives of removal of the lymphatics along the inferior mesenteric vessels. The operation takes far less time than the combined method. All the inconvenience of a large perineal wound, which takes long to heal, requires a daily dressing and involves risk of urinary infection, prolonged sepsis, and perhaps secondary hæmorrhage, is avoided and convalescence is shortened to at least half the time. Enough room to divide the bowel in an aseptic manner between clamps some 2 in. below the growth is almost essential. Additional room can often be secured after division of the peritoneum at its reflexion by gently mobilising the rectum. I have performed this operation frequently for many years and with a low mortality. I have never seen any serious trouble arise after the Hartmann operation from interference with the blood-supply of the rectum, the upper end of which is invaginated and covered by peritoneum, although sometimes the invaginated portion sloughs. In one instance severe reactionary hæmorrhage into the rectum occurred from the stump after the patient had been taken back to bed, demonstrating an excellent blood-supply in the lower end. Fortunately this alarming complication was dealt with successfully. In no instance following the Hartmann operation have I met with any secondary downward spread or recurrence in the stump. I am convinced that many lives have been cut short unnecessarily by a combined operation, lives that could have been prolonged and perhaps saved altogether by this less severe and yet entirely adequate operation for growths in this situation.

Conservative methods.—Dukes and Lloyd-Davies at St. Mark's have recently carried out a critical examination of 400 consecutive cases of perineal and combined excisions—in which the size, position, extent of local, vascular, and lymphatic spread had been recorded—to ascertain whether the tumour could have been successfully removed by some form of conservative resection, had the surgeon known, in advance, all the information about the growth which was subsequently established by the pathological examination and histological sections. The conclusions arrived at were that 129 (nearly a third) could have been dealt with successfully in this way, and that about an equal number showed that the growth had passed beyond the stage when any type of operation could have effected a permanent cure. If these 400 cases can be regarded as a representative series then it may be stated in general terms that in about half the cases that are capable of being cured by surgery the disease can be eradicated as well by local excision as by total proctectomy. Although this statement is governed by knowledge that can only be acquired after operation, it should nevertheless stimulate surgeons to reflect and to open the door to a modified radical excision when conditions appear favourable. This policy has long been advocated by Grey Turner.

When it is considered that on clinical grounds a growth that is above the peritoneal reflexion has not advanced beyond the B stage, a conservative resection-anastomosis conducted from the abdomen is perhaps the ideal, but careful selection is required. The risks of this type of operation increase if the patient is stout and the mesentery of the pelvic colon fat-loaded and short, if the growth is large and has contracted adhesions, and if it involves an anastomosis with that portion of the rectum which is uncovered by peritoneum. The mortality is higher for the male than for the female.

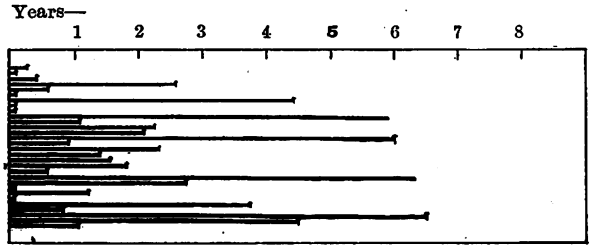
In carrying out a successful conservative resection within the abdomen preliminary drainage of the distal colon for some weeks is essential. A transverse colostomy as advocated by Devine (1937) and others is perhaps the best. The risk of leakage at the anastomosis is diminished by division or stretching

FIG. 5.—PERINEAL EXCISION



A—Growth limited to rectal wall.

B—Extrarectal spread but no glandular metastases.



C—Metastases in glands:

Survival in years, after perineal excision, showing the individual figures upon which the diagram in Fig. 4 is based.

of the sphincters and the passage of a tube up to the junction. In pre-war days before I adopted Miles's abdomino-perineal operation I carried out several operations for growths at or above the peritoneal reflexion, which were then described as "abdomino-anal." The essential principles of this operation were described in this country by Aldrich-Blake in 1903. The bowel was mobilised from the abdomen, divided from below just above the sphincters, and then pulled through the anus. One of these patients operated on in 1911 is still alive, or was only a few years ago.

The difficulty of ensuring a good blood-supply made me abandon this operation for the abdomino-perineal, but improvements and modifications in technique in recent years have brought this type of operation back into favour—several variations of which are practised, notably by Sebrechts, Babcock

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(1932), Arnold (1937), Rayner (1935), Pannett (1935), and others. It is however quite certain that the method should be reserved for comparatively early cases and small growths that are too low for abdominal resection and too high for a sacral anastomosis.

With growths lower down conservative resection and direct anastomosis can be carried out from below in selected cases, a method which Grey Turner (1935) has used with considerable success. The fact that the lymphatics and vessels are enclosed in a definite sheath of pelvic fascia, as emphasised by Wood and Wilkie, enables this operation for early cases to be performed without a too extensive "sweep out" of the pelvis which may hamper the blood-supply and excite sepsis at the junction.

The immediate success or failure of the various methods of conservative resection from above will depend to some extent on the conservation of the blood-supply from above, and on the degree of mobilisation and absence of tension at the anastomosis, as well as on the avoidance of leakage and sepsis, for which the preliminary measures already referred to are designed to prevent. The *ultimate* success will be determined by the existence or otherwise of extrarectal spread at the time of resection. Some cases with extrarectal spread dealt with on conservative lines at St. Mark's have developed fairly early recurrence at the anastomotic line or in the pelvis. Fig. 6 illustrates a growth removed by conservative resection, and also shows a recurrence at the line of anastomosis six months later; this was treated by an abdomino-perineal excision. That this recurrence resulted from implantation at the time of resection seems highly probable.

FIG. 6.—*Left:* A specimen of cancer of the rectum removed by tube resection followed by implantation recurrence.
Right: Same patient. Recurrence at the line of anastomosis followed by abdomino-perineal excision (C. N. Morgan's case).

The question of *implantation following resection* operations is, I believe, one to be considered seriously. Handling and pressure on the growth from without, before division of the bowel, may explain early recurrence at the anastomotic line and the case in Fig. 6 supports this view. I could record other instances of the same nature in dealing with colon growths. The following is a rather striking instance and one that also bears on the transition from innocency to malignancy over a period of years.

An elderly gentleman suffered from a villous tumour surrounding the lower end of the rectum which I removed, suturing the upper cut end to the anal margin. No evidence of malignancy was noted on histological examination. Seven years later he was found to have irregular, hard subcutaneous nodules round the anal margin which proved to be adenocarcinomata; the mucosa of the rectum was unaffected.

Attention has been drawn of late to the danger of undue handling of growths in the breast, and I think we should pay more attention to this point when dealing with the rectum on conservative lines.

CASES WITH LYMPHATIC SPREAD

My remarks hitherto have been mainly concerned with those cases that are mobile and considered early and in which no evidence of lymphatic spread has been detected when the abdomen has been opened. For all operable cases in which the evidence points to advanced disease—i.e., to a well-established C case—except those growths above the reflection, which can be dealt with radically by Hartmann's operation, the combined abdomino-perineal or perineo-abdominal is indicated. Arguments can be produced preferring the perineo-abdominal, especially for very large growths over which it may be difficult to close the pelvic floor. Advocates claim that there is less shock because the abdominal stage is shorter although the perineal stage is longer, and it is also argued that an operation begun as a perineal can be converted into a perineo-abdominal when conditions demand it.

A laparotomy before beginning the perineal stage to examine the liver and determine the extent of upward spread is essential for this operation, except perhaps in very early cases, and then some less severe measure should often be applicable. The time occupied by this procedure is saved in the one-stage abdomino-perineal. Some surgeons prefer a two-stage operation for either type so as to establish a colostomy in advance of the excision, and in recent years I have favoured this procedure for both operations, though it may be urged that the presence of a colostomy adds to the risk of infection during the abdominal stage. Sometimes also adhesions following division of the colon hamper the main operation.

Comparative statistics on operative mortality and end-results may in time give some lead to surgeons about the comparative values of these two methods, but the personal equation of the operators and the impossibility of obtaining a parallel series of cases is bound to vitiate statistics. The truth of the matter is that these are highly specialised operations which, whenever possible, should be reserved for highly specialised surgeons who have perfected their technique on a large series of cases. Great credit must be given to Ernest Miles and those who have followed him because they have brought the abdomino-perineal operation to such a high state of perfection. To Grey Turner, Gordon-Taylor, Gabriel, and others we are indebted for efforts to establish an alternative operation which can claim to be equally radical and yet offer less risk to the patient. Time alone will decide if they have succeeded.

Radical operations as distinct from conservative methods have attained a high measure of efficiency but will always remain tainted with the stigma of

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an artificial anus. The revival in recent years of conservative methods, which allow complete eradication, may help to remove this stigma. Time is required to perfect and standardise these methods. At the best they will only be suitable for the A and B cases, which at the present stage of diagnosis only account for about 50 per cent. of the cases.

Radium

For some years I endeavoured to find a way out with radium, and indeed this can and has been accomplished in a small proportion of operable cases with some brilliant results. I have, however, come to the conclusion that the results are too uncertain to justify its use for an operable case with our present knowledge, except when a radical operation is contra-indicated on general grounds.

In several instances, though in a small proportion, I have reduced fixed inoperable cases to a state of complete quiescence, if not cure. Some of these patients remain in good health for periods ranging from 7–10 years (Gordon-Watson 1935).

With radium en masse I have no personal experience. To-day research is busy with giant bombs and X ray plants working up to a million volts. Mottram (1936) has shown experimentally that, during treatment by radiation, sensitivity rises and falls, and affirms that if treatment could be spaced so as to catch the tumour always at times of high radio-sensitivity and avoid times of high radio-resistance better results would be assured. If this be true then the flexibility of these stupendous generators of gamma and X rays may open the door to results hitherto unobtainable.

Conclusion

Sir James Paget in his Bradshaw lecture observed that "better treatment will follow better diagnosis and better diagnosis will certainly follow a more exact pathology."

It has been my endeavour in the subject which I have chosen to emphasise the truth of this dictum, delivered by the father of surgical pathology more than fifty years ago.

I desire to record my debt of gratitude to the pathological and surgical staff at St. Mark's. Their fruitful labours have made this lecture possible.

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ROYAL SANITARY INSTITUTE.—A joint meeting of the institute and the Yorkshire branch of the Society of Medical Officers of Health will be held in the Town Hall, Dewsbury, on Friday, Feb. 11th. Dr. P. L. Sutherland will open a discussion on the laboratory examination of milk, and Dr. J. F. Galloway will speak on the maternity services.

ANÆMIA IN PRESCHOOL CHILDREN

ITS INCIDENCE IN SOUTH LONDON

BY THOMAS COLVER, M.B. Sheff., M.R.C.P. Lond.
OUT-PATIENT MEDICAL REGISTRAR AT THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND-STREET

THE incidence of anæmia among babies in the East End of London has been stressed by Mackay (1931). Similar observations among infants in Aberdeen have been made by Davidson and others (1935), and the predominating rôle of iron deficiency in the production of these anæmias has been established (Mackay 1931). In the school-child, on the other hand, anæmia is uncommon (Davidson and others 1933), and its incidence in the preschool period appears to occupy an intermediate position (Davidson and others 1935). The object of this inquiry has been to determine the degree and frequency of these preschool anæmias in South London. Full facilities were provided by the borough of Camberwell.

A total of 310 "normal" children of the borough were examined. They attended the special clinic by separate appointments, each attendance being arranged within a fortnight of the child's birthday. Hæmoglobin estimations were thus made on 100 infants aged a year, 100 aged two, 50 aged three, 50 aged four, and 10 aged five. Roughly half of these children had been under the supervision of welfare centres. Some 95 per cent. will probably enter the elementary schools of the London County Council, and 8 per cent. were members of families in extreme poverty.

The Haldane method for estimating the hæmoglobin content was used, the colour of the standard tube being checked before and after the investigation against that of a replica of the Price-Jones standard. The blood samples were obtained by heel puncture, the same two-edged stilette being used throughout. All colour matchings were made by the same observer.

Conclusions on the incidence of anæmia among these children must be preceded by a definition of the normal hæmoglobin range in childhood. On this subject there is still some lack of agreement, but it can be stated at the outset that the incidence of anæmia was high in relation even to the lowest standards.

NORMAL HÆMOGLOBIN

Babies of the hospital class exhibit at 12 months an average hæmoglobin level of approximately 70 per cent. on the Haldane scale (10 g. Hb. per 100 c.cm. blood) (Mackay 1931, Merritt and Davidson 1933). This average figure is raised considerably by iron medication (Mackay 1931, Kotikoff 1931, Usher 1935), and Mackay has shown that 86 per cent. Haldane (11·7 g. Hb. per 100 c.cm.) is the mean level thus attained. This higher figure, which may be termed "the iron standard" is thought to represent the optimum hæmoglobin level in infancy (6–12 months), variations of ± 10 per cent. (Haldane) being regarded as within the limits of normality. This optimum range is indicated by the shaded area in Fig. 1, and the corresponding standards adopted by Davidson (1935) for the years 2 to 5 are also indicated.

There are many children, however, in whom the blood hæmoglobin content is less than that represented by the "iron standard." They may appear healthy, and there is a widespread clinical impression that it is not always possible in these children to raise the hæmoglobin level to the "iron standard." These considerations have persuaded some authorities to accept lower standards of normality than those

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described. Thus Findlay (1937) regards as normal any hæmoglobin level that lies above that indicated by curve D in Fig. 1. Supporters of this view sometimes urge that the "iron standards" represent high hæmoglobin levels artificially attained by an increased iron intake but unattended by a corresponding improvement in health.

It is probably the consensus of opinion that the optimum hæmoglobin values are those represented by the "iron standards," and most clinical experiments (Mackay 1931) and observations (Spence 1934) support this view, but the case against the acceptance of the lower standard is not proved, and in this report the incidence of anæmia will be expressed in relation to both standards.

RESULTS

Curve A in Fig. 1 has been constructed from the results of this inquiry. It indicates the average hæmoglobin content during the first five years of life among children in South London. The importance of establishing the normal hæmoglobin standard is emphasised. In relation to the iron standard the average South London child up to the age of 3 is anæmic—in relation to the lower standard these average children have normal hæmoglobin levels. After 5 the level lies within the limits of the "iron standard."

Comparable results were reached during the Aberdeen investigation into iron deficiency when 64 preschool children were examined, and a similar conclusion is reached by an analysis of the figures obtained by Findlay (1937) in his examination of 70 preschool children of the East End of London.

Fig. 1, curve A, also reveals that the average hæmoglobin level of the one year old group in the present

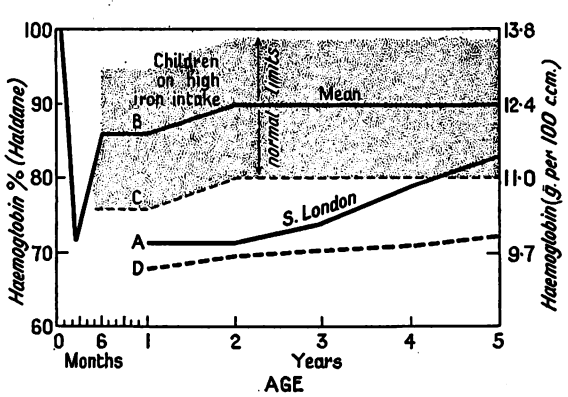

FIG. 1.—(A) Results of inquiry in South London (the figures are the numbers of children examined) compared with hæmoglobin standards at various ages; (B) mean of optimum range or iron standard (shaded area); (C) lowest limit of iron standard; (D) Findlay's normal (1937). In the South London children (A) there were 100 aged one, 100 aged two, 50 aged three, 50 aged four, and 10 aged five.

series corresponds almost exactly with that of the east end infants examined by Mackay (1931).

Fig. 2 indicates the hæmoglobin values of the hundred two year old children, and it is seen that in 7 per cent. of these the level fell below 60 per cent. (Haldane). Twelve per cent. of the one year group but none of the four year group children exhibited such low levels.

The results of the inquiry are summarised in Fig. 3. Here curve I indicates the proportion of cases in which the hæmoglobin level fell short of the lower limit of the "iron standard," curve II the proportion of cases in which the level was below Findlay's standard, and curve III the incidence of severe anæmia.

Any child in whom the hæmoglobin level fell more than 15 per cent. (Haldane) below the lower limit of the iron standard was considered severely anæmic.

SEVERE CASES

The 32 children in whom the hæmoglobin level fell more than 15 per cent. (Haldane) below the lower limit of the iron standard received iron medication. Not all were treated by the same observer and four different preparations of iron were used. After treatment, which in one case lasted as long as 14 weeks, no child remained in the severely anæmic class. In 28 of these children the hæmoglobin was raised to the limits of the lower standard already described, and in 24 the hæmoglobin level reached the limits of the iron standard. Thus after iron medication 8 children still show hæmoglobin levels that remain below the lower limit of the iron standard, but before these values can be accepted as normal, other possible nutritional deficiencies must be excluded (Parsons and Hawksley 1933) and certain focal infections eradicated (Fullerton 1937). It is felt that this group of infants merits full investigation.

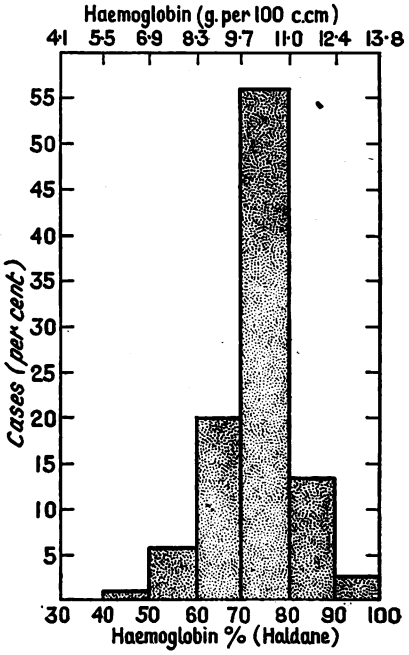

FIG. 2.—Hæmoglobin level in 100 two year old children.

FURTHER OBSERVATIONS

Influence of breast-feeding.—It has repeatedly been shown that the hæmoglobin level of the breast-fed infant is higher than that of the artificially fed. In the present series the difference was as much as 9 per cent. on the Haldane scale. In the two year group there was no such relationship. The records also show that 10 of the 26 artificially fed infants (less than 12 weeks breast-feeding) fell into the severely anæmic minority, whereas only 1 of the 51 breast-fed infants (at least 6 months breast-feeding) was of this group. Conversely, of the 12 grossly anæmic infants only 3 had been breast-fed for more than three months and only 1 for as long as six months. Weakly babies, however, are often unable to feed readily from the breast, and this fact is no doubt partly responsible for these findings.

Social circumstances.—In 24 children poverty was a factor, and for this group the average hæmoglobin curve fell 4 per cent. below that for the entire series. This was to be expected, but the number is small, and the findings must be confirmed by further investigation. In making hæmoglobin estimations on 17 better-class children the same instruments

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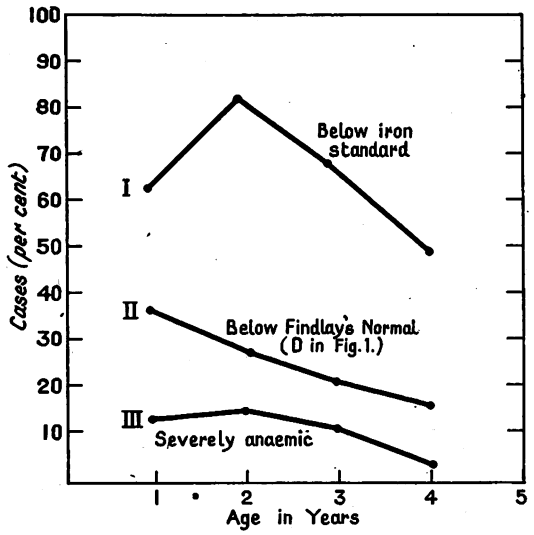

FIG. 3.—Incidence of anæmia in South London children. Percentage in which hæmoglobin level fell below (curve I) lower limit of iron standard, (curve II) lower limit of normality deduced by Findlay, and (curve III) more than 15 per cent. (Haldane) below lower limit of iron standard.

were used. The ages ranged from 10 months to 5 years. In 12 cases the hæmoglobin level reached the iron standard, and in all cases exceeded 70 per cent. (Haldane). In this connexion it may be noted that in 25 of these children investigated by Spence (1934) the average hæmoglobin level lay well within the limits of the iron standard.

SUMMARY

1. Hæmoglobin estimations performed on 310 pre-school children of South London revealed that 10 per cent. of those up to the age 3 years exhibited a severe anæmia which responded to iron therapy.

2. The normal hæmoglobin range in infancy is discussed. By comparison with the lowest hæmoglobin standards, anæmia was present in 36 per cent. of the 1 year infants, 27 per cent. of those aged 2, 20 per cent. of those aged 3, and 15 per cent. of those aged 4. By comparison with the "iron standards" this incidence is doubled.

3. Severe anæmia was uncommon after 3 years of age, and anæmia of any type after 4.

4. Until adequate preventive measures are adopted the more frequent use of the hæmoglobin estimation is urged.

I wish to thank Dr. Howell W. Barnes, medical officer of health of the borough of Camberwell, both for his active interest and for arranging every facility. Thanks are also due to Dr. Donald Paterson, who kindly permitted some of the anæmic children to be treated in his out-patient department at the Hospital for Sick Children, Great Ormond-street.

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EFFECT OF SULPHANILAMIDE ON THE BLOOD PICTURE

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IN view of the increasing number of reported blood dyscrasias following the use of sulphanilamide and its derivatives I have tried to determine whether these drugs exert any consistent effect on the bone-marrow.

METHODS

The activity of the bone-marrow was estimated by enumeration of the reticulocytes and leucocytes in the peripheral blood. Whenever possible observations were made daily or every second day for a definite period before the administration of the drug, during treatment, and for a varying period after cessation of therapy. The duration of the latter period depended on the return to or maintenance of normal levels and the length of stay of the patient in the hospital. It was not always possible to obtain satisfactory control periods. In several cases when the drugs were used as an emergency procedure it was not considered justifiable to withhold treatment. The reticulocytes and leucocytes were counted by the methods described by Price-Jones, Vaughan, and Goddard (1935). The reticulocyte count by this technique varies normally from 0·0 to 2·0 per cent. and the leucocytes from 2000 to 14,000 per c.mm.

MATERIAL

No effort was made to select the patients except that those with recent hæmorrhage were excluded, thereby eliminating all post-partum cases. Patients receiving, or about to receive, sulphanilamide were reported to the laboratory and no consideration other than the amount of work at hand determined whether the case was investigated or not. In none of the cases studied over an adequate period was any factor apparent that would influence the results, apart from the disease itself and its treatment. In addition to the ten cases tabulated nine others were observed on which less systematic blood examinations were made.

Prontosil album (sulphanilamide, the active principle of this group of drugs) was given by mouth in all cases with the exception of one of the non-tabulated cases which received three doses of Prontosil flavum (rubrum), corresponding to 1·5 g. of sulphanilamide, by intramuscular injection. The patient was then treated with prontosil album by mouth. The total dose varied from 7 to 123 g. administered over a period of 3–28 days. The cases treated were of a varying nature as shown in the Table. Six women and four men were examined systematically, roughly the same proportion holding for the non-tabulated cases. The ages ranged from childhood to old age with no predominant age-group.

RESULTS

The results of the adequately studied group are shown in the Table. The figures before and after treatment are average counts except in the case of the reticulocytes for which maximum and minimum levels are reported. In cases in which only one observation is recorded before treatment, there was only one reticulocyte count for this period. Only

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TABLE SHOWING RESULTS

—	Disease.	Sex.	Age.	Dose (g.).	Duration of treatment in days.	Before treatment.					During treatment.	After treatment.				
						R.B.C. mil./cm.	Hb. % (Haldane).	W.B.C. per cm.	Reticulocytes (%).		Retics.	R.B.C. mil./cm.	Hb. % (Haldane).	W.B.C. per cm.	Reticulocytes (%).	
									Max.	Min.					Max.	Min.
1	Ulcerative colitis.	F.	18	42	14	3·8	72	8,000	1·6	0·8	4·6	4·1	71	8,000	3·7	0·7
2	Endocarditis.	M.	42	123	30	4·1	70	8,000	2·2	..	2·5	4·7	78	5,000	0·5	0·4
3	„	F.	14	18	6	4·4	79	9,000	3·2	..	1·9	4·5	78	7,000	4·6	1·7
4	Erysipelas.	F.	66	13	5	5·2	82	30,000	0·7	..	1·3	4·6	78	9,000	3·4	0·4
5	Urinary infections.	M.	72	21	7	4·8	85	3,000	1·1	0·3	1·3	4·5	81	7,000	2·1	0·8
6	„ „	M.	57	21	7	4·3	86	7,000	2·5	0·8	1·5	4·0	78	7,000	1·9	1·0
7	„ „	F.	67	14	5	4·9	81	14,000	1·4	0·9	0·8	5·2	84	10,000	1·1	0·9
8	„ „	F.	10	21·5	10	4·6	92	8,000	1·9	1·3	1·6	4·3	86	9,000	1·8	1·7
9	„ „	F.	51	9	3	5·2	96	7,000	2·7	2·3	2·8	5·1	95	8,000	3·4	2·1
10	Cellulitis.	M.	22	7	3	4·5	102	8,000	2·0	..	1·8	5·0	102	7,000	2·2	1·5

R.B.C. = red blood-cells. W.B.C. = white blood-cells.

the maximum reticulocyte counts are noted during treatment. In four of the cases the reticulocyte level was above the normal 2 per cent. before treatment was started, a finding compatible with work in progress which indicates that a mild reticulocytosis is not uncommon in the presence of sepsis. In three of these cases no increase in the reticulocytes by more than 1·4 per cent. was observed and in the others there was no rise at all. Of the six cases with normal initial counts three showed an increase above 2 per cent. either during the period of treatment or in the after-period, the highest figure reached being 4·6 per cent. All cases returned to their original levels within a week of cessation of therapy. The red cells, hæmoglobin, and leucocyte levels remained essentially unaffected.

The other nine cases were observed only after therapy had started or was completed and only a few observations were made. In none of these was any rise of reticulocytes above 2 per cent. noted.

DISCUSSION

The size of the total dose and daily dose used is comparable to the range of dosage used for most cases of streptococcal and meningococcal infections (Smith 1937, Schwentker et al. 1937). Except in Case 2 it is definitely smaller than the doses used by both Crean (1937) and Cokkinis (1937) in the treatment of gonorrhœa and by Colebrook (1937) for streptococcal puerperal infections.

Apart from cases in which either anæmia or agranulocytosis has arisen, there have been no adequate observations on the cellular elements of the blood in patients under treatment with sulphanilamide. Finklestone-Sayliss et al. (1937) found that in rabbits the reticulocyte count remained almost unchanged despite very large doses (1·2 g. per day) although "abnormal and nucleated" red cells were noted. Since the beginning of 1937 17 cases of blood disorders have been reported, 12 examples of "anæmia" and 5 of agranulocytosis, arising during or after treatment (Harvey and Janeway 1937, Jennings and Southwell-Sander 1937, Borst 1937, Plumer 1937, Kohn 1937, Model 1937, Young 1937). The total doses used varied widely between 4 g. (Kohn) and 152 g. (Jennings). Of three of these no data are available as they were reported in a personal communication of Long to Kohn (1937). Seven of the remainder had doses under 50 g. (comparable to the dosage of the present series) and only one case had more than 100 g. Sulphanilamide was the most commonly used preparation but Proseptasine and prontosil flavum were also used. On the other hand Colebrook, who uses doses considerably larger than those employed in the present series, has reported no blood dyscrasias. The evidence available suggests that such mishaps are probably due to "personal idiosyncrasy" as in the case of allied drugs such as amidopyrine.

No attempt is made here to explain the rise of the reticulocytes other than to suggest that moderate doses of sulphanilamide seem to act as a mild stimulus to the bone-marrow. Further work is required to determine the relationship of this phenomenon to those cases in which a severe anæmia arises.

CONCLUSION

Moderate doses of sulphanilamide may stimulate a slight rise in the reticulocyte level. This is not necessarily associated with anæmia or leucopenia.

I am grateful to the chief medical officer of the London County Council and to the physicians and surgeons of the British Postgraduate Medical School for permission to investigate patients in Hammersmith Hospital.

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HORMONE CONTENT OF OVARIAN TUMOURS

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THE following is an account of two related investigations we have made into the œstrin content and prolan content of ovarian tumours.

I. Œstrin Content of Ovarian Cysts Associated with Metropathia Hæmorrhagica

Schroeder in 1928 gave a very full account of the disease which has been called metropathia hæmorrhagica. This disease is characterised by hypertrophy of the mucous membrane and muscular wall of the uterus, and is the result of persistence of a ripe ovarian follicle, and the consequent absence of a corpus luteum.

Uterine changes.—The uterine mucous membrane is thickened, polypoid, and intensely congested. The microscopic appearances are characteristic, the chief features being that the glands are numerous and often greatly dilated, but the epithelial cells are still in the stage of proliferation owing to continuous stimulation by the œstrin in the persistent follicle. There is intense congestion of the vessels under the surface epithelium, with hæmorrhage into the stroma and areas of necrosis due to thrombosis of vessels. There is no evidence of any progestin effect on the epithelium.

Symptoms.—The result of these changes is that true menstrual periods do not occur. The patient suffers from irregular hæmorrhages, often profuse and lasting weeks or even months, or there may be amenorrhœa for a few months followed by irregular hæmorrhages, usually of the type and duration described above.

Metropathia hæmorrhagica was described in this country by Wilfred Shaw in 1929. He did not agree with Schroeder about the ætiology of the disease.

Since the descriptions of the disease by Schroeder and Shaw, Zondek and other German observers have established the presence of œstrin in the fluid of the ovarian cysts associated with this condition. Nevertheless it seems worth while to record our results obtained in studying the fluid from twelve follicular cysts, removed at operation. The uteri were removed at the same time from eight of the patients. Two of these uteri contained fibroids which were partly submucous; these may have been responsible for the menstrual symptoms which were present. The other six showed the changes characteristic of metropathia hæmorrhagica in the mucous membrane or muscular wall in varying degree.

THE INVESTIGATION

Collection of the fluid.—The fluid was aspirated from the cysts as soon as possible after operation. From the eight cysts removed with uteri, 8–10 c.cm. of fluid was collected from three cases; 14–15 c.cm. from three cases; and 25 c.cm. from two cases.

Animal experiments.—Spayed rats were used for the tests. They were examined and found not to be having œstrous cycles before any fluid was injected. An injection of 2 c.cm. of the cyst fluid was given subcutaneously morning and afternoon for two days. Vaginal smears were taken morning and evening for 4–5 days and examined for the occurrence of œstrus. The result was not considered positive unless the film showed cornified cells only. The rats required a dose of 3–4 rat units of Œstroform (B.D.H.) to produce a reaction of this intensity.

It was found that 8 c.cm. of cyst fluid always produced œstrus in a rat, except for one partial reaction, described later. When a larger amount of fluid was available, the experiment was repeated with 4 and 2 c.cm. Three fluids produced œstrus when 2 c.cm. was given, and 1·5 c.cm. of one fluid was sufficient to produce œstrus.

Zondek considers that a normal ripe follicle contains 2–3 c.cm. of fluid and that ¼–½ c.cm. of this contains one mouse unit of œstrin. A rat requires rather more than twice as much hormone as a mouse to bring it into œstrus; therefore the fluids tested contained at least the same concentration of œstrin as is found in the normal follicle. Taking the average volume of fluid in a ripe follicle as 2·5 c.cm. the amount present in these follicular cysts was three to ten times the normal.

The largest amount of fluid collected from a follicular cyst was 30 c.cm. This was from a patient aged 36 years who had been bleeding continuously for ten months. The uterus was not removed, but part of the other ovary had to be resected. She remained free from symptoms for eight months after the operation and then relapsed.

CASES ILLUSTRATING CHANGES IN THE UTERI

The changes are due to excessive stimulation of the uterine mucous membrane with œstrin.

CASE 1.—Mrs. A., aged 39, under the care of Miss E. Bolton. Admitted to hospital complaining of continuous uterine bleeding for 2½ months since the onset of the last normal period. She had been married 7 years, had had no children and no miscarriages. Normally the menstrual rhythm was 6–8/28 days. The patient was anæmic, the hæmoglobin being 62 per cent.

Uterine mucous membrane showing dilated glands. (×23.)

Panhysterectomy and left oöphorectomy were performed. The uterus measured 3¾ × 3½ × 2½ in., and contained an interstitial fibroid 1¼ in. in diameter. The mucous membrane was thick, polypoid, and intensely congested, and sections showed all the changes typical of metropathia hæmorrhagica (see Figure). Although there was some increase in the size of the fundus, the mucous membrane was chiefly affected in this case. The left ovary contained a thin-walled cyst, 1¼ in. in diameter, from which 10 c.cm. of fluid was obtained; 2 c.cm. of this fluid brought a rat into œstrus.

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CASE 2.—Mrs. B., aged 46, under the care of Miss Bolton. Admitted to hospital complaining of irregular periods for a year (3–4 days/3–5 weeks). The loss had been continuous for three weeks. Until a year ago the menstrual rhythm had been regular, 3/28 days.

Panhysterectomy and removal of cyst of left ovary were performed; the right ovary appeared healthy. The uterus measured $4\frac{1}{2} \times 3\frac{1}{2} \times 2\frac{1}{2}$ in. The mucous membrane was thickened at the top of the fundus; sections showed typical dilated glands at the top of the fundus only. In this case the muscular coat was chiefly affected. The ovarian cyst was 2 in. in diameter and contained 15 c.cm. of fluid, 1·5 c.cm. of which produced œstrus in a rat.

CASE 3.—Miss F., aged 46, under the care of Miss E. Sylk. Admitted to hospital complaining of continuous uterine bleeding for three months. The menstrual rhythm was previously regular, 4–5/24 days, the loss being usually rather profuse and sometimes excessive.

Panhysterectomy and left oöphorectomy were performed; the right ovary appeared to be healthy. The uterus measured $5 \times 4\frac{1}{2} \times 3$ in.; the anterior wall was $1\frac{1}{2}$ in. thick, the posterior wall $1\frac{1}{2}$ in. thick. The mucous membrane was thickened and shaggy at the top of the fundus. The left ovary measured $1\frac{1}{2} \times 1\frac{1}{2} \times 1$ in. and contained three cysts from which 4, 4, and 8 c.cm. of fluid were obtained. 4 c.cm. of fluid from one of the cysts produced œstrus in a rat, but the 8 c.cm. from the larger cyst only gave a partially positive reaction.

In this last case the thickening of the uterine wall was due to a diffuse adenomyoma. It is said that there is always an unusual degree of irregularity at the junction of the mucous membrane with the muscular coat in cases of metropathia hæmorrhagica, but here the adenomatous condition extended deeply into the muscular coat. The symptoms had been present for only three months, but the condition of the ovary suggested the repeated development of small cysts. Possibly these at first caused the adenomatous proliferation and later the vascular changes in the endometrium which were well marked at the top of the fundus.

In another case with typical symptoms of metropathia hæmorrhagica the left ovary contained two cysts and the uterus showed a very early adenomyomatous condition at the top of the fundus. The mucous membrane at the top of the fundus showed proliferation of the glands, thrombosis of the vessels, and some necrosis. Unfortunately no fluid was obtained from the cysts.

SUMMARY OF SECTION I

The fluid from a number of follicular cysts of the ovary has been tested for œstrin. The concentration of œstrin in the fluid was of the same order as in the normal ripe follicle. Owing to the increased volume of fluid, the absolute amount of œstrin in the ovary was considerably increased.

Characteristic changes were found in the mucous membrane and muscular coats of the uteri. These changes may be more evident either in the mucous membrane or in the muscular coat, and sometimes both are equally affected.

II. Comparison of the Hormone Content of Various Ovarian Tumours and Cysts

The widespread use of the Aschheim-Zondek reaction for the diagnosis of pregnancy has established the fact that prolan A may be excreted in the urine of patients who have rapidly growing tumours of the uterus or ovary. Prolan B has also been found in such cases, but only when concentrates from a large volume of urine were used (Zondek 1935).

The fluid from ovarian tumours has been examined much less often than the urine from patients with ovarian tumours, and it was the object of these experiments to compare the effect produced by injection of the fluid from tumours with that produced by the urine collected before the operation from the same patient.

Similar investigations have been described by Philipp (1934). He examined about 70 ovarian tumours for hormone content, using cyst fluid where this was available; where the tumour was solid he implanted portions of it. For some tumours, both cyst fluid was injected and solid part was implanted. A corresponding pre-operative catheter specimen of urine was also examined for hormone content in each case. Castrated female mice were used for examination for œstrin.

Philipp found that all ovarian cysts and tumours containing hormones affected the uterus, leading to irregular menstruation.

THE INVESTIGATION

Collection of fluid and urine.—The fluid was collected from the tumour, with sterile precautions, as soon as possible after removal from the body. Urine collected on the morning of the operation was used in the earlier experiments, but later it was found that the amount thus obtained was not always enough to enable the experiments to be repeated, so a pre-operation 24-hourly specimen of urine was collected in a Winchester bottle containing a small amount of ether.

Animal experiments.—Rabbits weighing not less than 1300 g. were used for testing for prolan A and prolan B. They were obtained from a dealer who supplied them as suitable for the Aschheim-Zondek test. In addition they were always isolated for three weeks before use. The rabbits were injected intravenously with 12 c.cm. of ovarian fluid or urine each morning and afternoon for two days; they were then examined about 48 hours after the first injection.

Spayed rats, shown not to be having œstrous cycles, were used for testing for œstrin. An injection of 2–3 c.cm. of fluid or urine was made subcutaneously each morning and afternoon for two days (8–12 c.cm. in all). Vaginal smears were made twice daily for four or five days and examined for changes indicative of œstrus.

If a rat had not been brought into œstrus by one of the experiments for a period of four weeks, 4 rat units of œstroform (B.D.H.) were given in 4 doses of 1 unit each. It was found that a smaller dose of 2 or 3 rat units of œstroform was not always sufficient to produce a completely keratinised smear in the spayed rats. A positive result must therefore not be taken to represent 1 rat unit of œstrin, but some amount between 1 and 4 rat units.

THE FINDINGS

1. *Malignant ovarian tumours* (20 cases).—Some tumours were solid and no fluid was obtained from these. The types were as follows:—

Adenocarcinomata	12 cases.
Bilateral papilliferous cysts	2 „
Multilocular pseudomucinous cyst, microscopically suggestive of malignancy	1 case.
Secondary carcinomata	3 cases.
Inoperable tumours (type unknown)	2 „

The material (all of which was examined for prolan) was:—

Fluid and urine	7 cases.
Fluid alone	5 „
Urine alone	8 „

Prolan A was found in all the material examined, often in high concentration, except in one case where the test was negative. The fluid and the urine produced about the same effect, sometimes one and sometimes the other giving the greater number of enlarged follicles. The pre- and post-operation

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TABLE I—TO SHOW THE MENSTRUAL HISTORY ASSOCIATED WITH DIFFERENT OVARIAN TUMOURS

Type of tumour.	Number of cases.	Menopause present.	Menstrual history.		Change in rhythm.	Proportion showing change in rhythm or irregularity.	Remarks.
			Periods regular.	Periods irregular.			
Dermoid cysts.	6	0	5	0	1	1/6	Cyst present in other ovary in case where rhythm altered.
Pseudomucinous cysts.	12	3	7	2	0	2/12	—
Malignant tumours.	17	8	5	3	1	4/17	—
Papilliferous cysts.	3	1	2	—	—	0/3	—
Germinal cysts.	12	4	3	4	1	5/12	Two of the 4 patients with irregular periods had follicular cysts in addition to germinal cysts.
Follicular cysts.	20	0	0	10	10	20/20	—

specimens of urine from one patient gave one blood point in one rabbit ovary, but in no other case was the test for *prolan B* found to be positive. Since this effect was observed both before and after the operation, it was therefore not due to the presence of the tumour. No error in technique could be found to account for this result.

2. *Multilocular pseudomucinous cysts* (12 cases).—The material examined was:—

Fluid and urine .. .. 5 cases.
4 fluids tested both for prolans and œstrin.
3 corresponding urines tested for prolans only.
1 corresponding urine tested for prolans and œstrin.
1 fluid tested for œstrin only.
1 corresponding urine tested for prolans only.
Fluid alone .. .. 5 cases.
2 for prolans only.
3 for œstrin only.
Urine alone .. .. 2 cases (for prolans only).

Prolan A was present in fluid and corresponding urine in four cases, and absent in one. Of two cases where fluid alone was examined, prolan A was found in one and not in the other. Of two cases where urine alone was examined, prolan A was found in each. The prolan A was rarely in so high a concentration as in cases of malignant ovarian cysts. Neither *prolan B* nor *œstrin* was found in any case.

3. *Dermoid cysts* (6 cases).—The material examined was:—

Fluid and urine .. .. .. 4 cases.
2 fluids tested for prolans.
4 urines tested for prolans.
2 fluids tested for œstrin only.
Fluid alone .. .. 1 case (for prolans only).
Urine alone .. .. 1 „ „ „

Fluid and corresponding urine of two of the four cases were examined for prolan A; it was present in both fluid and urine; it was present in the urine of one case of which the corresponding fluid was tested for œstrin, not prolans; absent in the other case. Prolan A was also present in the case where fluid alone was available, and in the case where urine alone was available. Neither *prolan B* nor *œstrin* was found in any case.

4. *Cysts derived from the germinal epithelium* (11 cases).—The material examined was:—

Fluid and urine .. .. 5 cases.
5 fluids for prolans and œstrin.
4 urines for prolans only.
1 urine for œstrin only.
Fluid alone .. .. 6 „
3 for prolans only.
3 for œstrin only.

Prolan A was present in all cases except one where it was absent from the urine though present in the cyst fluid. Prolan B was not found in any case, and *œstrin* was found in only two. In one of these it was found in the cyst fluid (the corresponding urine was not tested). In the other it was present in the cyst fluid and in the urine concentrated by boiling. In the first of these two cases the other ovary was cystic but no fluid was obtained from it. An injection of 12 c.cm. of fluid from the germinal cyst in this first case produced œstrus; 8 c.cm. did not. The other ovary of the second patient was said to be normal.

It is possible that in both these cases the œstrin in the germinal cyst was due to the presence of excess œstrin in the blood stream. Blood was not taken at the time of operation for testing for œstrin, so this hypothesis could not be verified.

5. *Cysts from pregnant patients* (3 cases).—The conditions studied were:—

(a) *Pseudomucinous cyst.*—Patient 23 weeks pregnant. Prolan A and prolan B reactions strongly positive with the cyst fluid and with the urine. Œstrin not found in the cyst fluid, present in the urine.

TABLE II—TO SHOW THE ASSOCIATION OF PAIN IN AND SWELLING OF THE BREASTS BEFORE AND AT THE BEGINNING OF MENSTRUATION WITH DIFFERENT TYPES OF OVARIAN CYST

Type of cyst.	Number of cases.	Breast symptoms present.	No breast symptoms.	No note made.	Proportion with symptoms.	After-history and other notes.
Dermoid cysts.	6	1	3	2	1/4	In case where breast symptoms present, no change after operation.
Pseudomucinous cysts.	12	3	7	2	3/10	Two of the 3 cases showing symptoms had cysts in the other ovary. One of these and the third case still had breast symptoms after operation.
Germinal cysts.	12	1	8	3	1/9	—
Follicular cysts.	20	10	7	3	10/17	Of 6 patients who replied to letter of inquiry, 5 cured of all symptoms, including breast symptoms; 1 well for 8 months, then all symptoms (breast symptoms and profuse uterine hæmorrhages) recurred.

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(b) *Lutein cyst.*—Patient 12 weeks pregnant. Prolan A and prolan B reactions strongly positive in the cyst fluid. Œstrin not found.

(c) *Germinal cyst.*—Patient 18 weeks pregnant. Cyst fluid only obtained. Urine not available. Slightly positive prolan A reaction with 20 c.cm. fluid. Prolan B reaction negative with 20 c.cm. fluid.

This last result was so surprising that some of the fluid was sent to the Pregnancy Diagnosis Laboratory in Edinburgh. A negative Aschheim-Zondek reaction was reported. The patient was subsequently delivered at term.

6. *Follicular cysts* (20 cases).—The material examined (all for œstrin) was:—

Fluid and urine	1 case.
Fluid alone	14 cases.
Urine alone	5 „

In most cases a single follicular cyst was found, containing 4–25 c.cm. of fluid; in three cases several small cysts were present, and less than 2 c.cm. fluid was obtained from each ovary; in one case blood cysts were present in both ovaries.

It was found that 8 c.cm. of cyst fluid always produced œstrus, while 2 c.cm. produced œstrus except in one case. Of the three cases where less than 2 c.cm. was obtained, one gave a positive reaction. An emulsion in saline made from the material contained in the bilateral blood cysts did not produce œstrus. Five urines were tested. One, whose corresponding cyst fluid produced œstrus, also gave a positive result. Of the other four urines, one unconcentrated specimen produced œstrus; one produced œstrus only after concentration by boiling; and two were negative even after concentration by boiling.

CHANGES IN UTERUS AND OVARIES IN CASES OF FOLLICULAR CYSTS

In 14 of the 20 cases, uteri as well as ovaries were removed. Submucous fibroids were found in three of these uteri. Six of the uteri showed changes typical of metropathia hæmorrhagica.

In the ovaries of 4 of the 20 cases, lutein tissue was present in addition to the follicular cysts. In these cases the microscopical changes in the endometrium were modified accordingly.

It is interesting to note that in all cases of follicular cysts, there were alterations of the normal menstrual rhythm. Table I brings out this point clearly. This finding corresponds with that of Philipp.

A symptom noted more frequently with follicular cysts than with any of the other ovarian tumours was pain in, and swelling of, the breasts before and sometimes during the menses. The patients did not complain of this, regarding it as natural; they only yielded the information in reply to direct inquiry. Table II shows the frequency of this symptom in the whole series, excluding malignant cases. Though this symptom is found in many normal women of all ages, its special frequency in cases of follicular cysts appears significant.

SUMMARY OF SECTION II

1. A total of 70 ovarian tumours and the corresponding pre-operation urines have been examined for prolans A and B and for œstrin.

2. Prolan A was found in larger amounts in the cyst fluid and urine in cases of malignant than in cases of innocent ovarian tumours. This prolan may be found, however, in all varieties of ovarian tumours.

3. Prolan B was found in the cyst fluid in 2 out of 3 pregnant patients.

4. The only cysts that yielded œstrin were the follicular cysts where it occurred in a concentration at least as high as in the normal follicle, and 2 specimens of germinal cysts in which the concentration was so low as to suggest that it was the same as in the blood stream.

5. The association of menstrual irregularities with follicular cysts has been confirmed. Other ovarian tumours are far less often associated with disturbance of menstrual rhythm.

6. Pain in and swelling of the breasts before a period was noted more often in patients with follicular cysts than in patients with other types of benign ovarian tumours.

Our best thanks are due to the surgeons of the Elizabeth Garrett Anderson Hospital, whose coöperation with the pathologists enabled the material to be collected. The animal experiments were carried out first in the physiology department at St. Thomas's Hospital (by C. L. G. P.) and then in the pathology department at the Royal Free Hospital (by D. M. V.). We are grateful to Prof. John Mellanby and to Prof. R. A. Webb for giving facilities at their laboratories. The expenses of this investigation have been met by a grant from the British Medical Association.

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THE RESPONSE OF PELLAGRINS TO NICOTINIC ACID

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Spies, Cooper, and Blankenhorn (1937) recently demonstrated that nicotinic acid promptly relieves pellagrous glossitis, stomatitis, ptyalism, vaginitis, urethritis, and proctitis, and from their results concluded that nicotinic acid is an antipellagric factor. The present report confirms these results, and in addition presents evidence that the increased porphyrinuria associated with pellagra disappears on the administration of nicotinic acid.

Fifteen persons with characteristic pellagrous symptoms were studied by methods previously reported (Spies 1932, 1933, 1934). These methods, in brief, consisted in selecting severely ill pellagrins with classical mucous membrane lesions, isolating them, and controlling conditions so that the patient would eat only a basic diet. Accordingly, if the mucous membrane lesions are fiery red and do not improve while the patient is restricted to a basic diet, these lesions serve as an index for measuring the potency of any single therapeutic agent. If the substance to be tested is of therapeutic value, there is prompt healing of these lesions when adequate amounts of it are added to the basic diet. Within 48–72 hours the tongue and oral mucous membrane lesions appear normal. It has been shown that great difficulty arises when one attempts to use the dermatitis of pellagra as an index to judge the efficacy of treatment (Spies 1935, Smith and Ruffin 1937). Three of the patients in this study were given nicotinic acid parenterally in sterile physiological saline, in divided doses, totalling from 40 to 80 mg. in 24 hours. The remaining twelve patients received an aqueous solution of nicotinic acid orally, in divided doses, totalling from 200 to 1500 mg. per day. The majority

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of these patients received 500 mg. per day in doses of 100 mg. each. The urine was tested frequently for increased porphyrinuria by the method of Beckh, Ellinger, and Spies (1937).

A representative case of pellagra, treated with nicotinic acid, follows.

An elderly white male was told one year ago that he had high blood pressure. He became frightened and restricted his diet to carbohydrates and fats, and from that time on refused to eat any meat, eggs, or milk. Nine months after beginning the dietary restriction, he noticed pain and abnormal redness of his tongue which progressed until the entire mouth became sore and fiery red. When seen by me ten months after the dietary restriction was begun, the patient had characteristic pellagrous glossitis and stomatitis and increased porphyrinuria.

He was studied in the following manner: (1) Keeping his diet constant he was given ten doses of 100 mg. each of nicotinic acid, with the result that at the end of 48 hours the symptoms of pellagra and increased porphyrinuria had disappeared. (2) Nicotinic acid was then discontinued, the diet remaining the same. Three weeks later he noticed pain and abnormal redness of the tongue and mouth. Physical examination showed characteristic lesions of pellagra, and examination of the urine showed excessive porphyrinuria. Nicotinic acid was administered as before and was followed promptly by the disappearance of pellagrous symptoms and porphyrinuria. (3) The nicotinic acid was again discontinued and the diet was not changed. At the end of three weeks the patient had slight but definite evidence of pellagra and increased porphyrinuria. Again nicotinic acid was administered, and again the pellagrous symptoms and increased porphyrinuria disappeared promptly. The nicotinic acid was discontinued and the patient urged to eat large amounts of meat, milk, and eggs. He was seen one month later and was eating milk, meat, and eggs each day. He appeared in excellent health and was working.

The studies on the fifteen pellagrins of the present report showed that the administration of nicotinic acid to pellagrins is followed promptly by remission of the pellagrous glossitis, stomatitis, ptyalism, vaginitis, urethritis, and proctitis, and by disappearance of increased porphyrinuria. None of these manifestations of pellagra returned so long as the patient continued to take the nicotinic acid, even though he ate only a basic diet. The pellagrous symptoms did return, however, if the patient continued to ingest only a pellagra-producing diet and did not take nicotinic acid.

Nicotinic acid is extremely cheap and easily administered. Though neither the maximal nor the minimal dosages have been determined, it is tentatively recommended from these studies that 0·5 g. per day, given in five doses of 100 mg. each, is safe and effective for the usual case of pellagra. It is rarely necessary to administer nicotinic acid parenterally, but in three cases we have had remission of the symptoms when 10–20 mg. was injected in sterile physiological saline four times a day. Since nicotinic acid is only one of the essential chemical substances found in the diet, it is recommended that all patients with pellagra be given a well-balanced diet when nicotinic acid is used as a supplement.

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A CASE OF PELLAGRA SUCCESSFULLY TREATED WITH A FILTRATE FACTOR OBTAINED FROM LIVER

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To Goldberger we owe the first clear indications that pellagra is a deficiency disease related to a dietary factor often associated with what is to-day termed the vitamin-B complex. The first indication that a water-soluble vitamin was concerned was provided by Voegtlin, Neill, and Hunter (1920) who found that administration of protein-free extracts prepared from liver and certain other foods had a beneficial effect on human pellagra. Six years later Goldberger, Wheeler, and Lillie found that acid extracts of yeast given in doses of 15 g. daily (dry weight) protected patients living on a diet liable to cause the disease. These observations tended to shake the older theory which related pellagra to subsistence on diets containing protein of low biological value.

The development of Goldberger's work on human pellagra, and also on the related condition known as black-tongue, which can be produced experimentally in dogs by feeding them on "pellagra" diets, led to a suspicion that the pellagra-preventive (P–P) factor might be identical with vitamin B_2, one of the components of the B-complex. For a time the evidence was very confusing, but, looking back, this is not surprising, because it gradually emerged that the factor B_2 was itself a "complex." One of the constituents, which is now sometimes referred to as B_2, is the pigment lactoflavin, a substance sharply characterised by determination of its chemical constitution and its synthesis. Its function in the body is unknown, although it is thought that it may play a part in oxidation-reduction processes. It seems clear, however, that it is not directly related to pellagra for the administration of pure lactoflavin failed to improve the condition of pellagrins (Dann 1936, Spies and Chinn 1935).

A second factor in the B_2-complex is provisionally termed B_6. It is certainly related to interesting deficiency conditions in experimental animals in which dermatitis is a prominent symptom, but it is ruled out as a primary factor in pellagra by the fact that certain preparations rich in B_6 do not benefit cases of pellagra (Dann).

Preparations of B_2-complex from which both lactoflavin and B_6 have been removed contain other factors which appear to improve nutrition and to these there has been given the rather unsatisfactory label "filtrate-factor" (Lepkovsky and Jukes 1936). Recent work suggests that there is more than one vitamin in such material, but differentiation has not yet proceeded far. A careful experimental investigation supported by a critical survey of the literature on the relation of these vitamin-B factors to human pellagra and other forms of dermatitis of dietary origin has recently been published by L. J. Harris and his collaborators (Birch, György, and Harris 1935, Harris 1936). This makes it clear that the dietary factor which gives protection against human

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pellagra is neither lactoflavin nor B_6. It is almost certainly a vitamin present in the filtrate factor.

A preliminary communication from the United States (Fouts et al. 1936) announces that two cases of human pellagra improved rapidly after giving preparations of their filtrate factor. The preparations were made from liver, but it is not apparent how much liver corresponded to the dose of the preparation K.50 which was given to the two patients. Four patients in all were investigated. They were placed on a special maize diet (Spies 1935) on entering hospital. Two were given liver extract and rapidly recovered. The other two were given filtrate factor prepared from liver extract and showed remarkable improvement in a few days.* It is important to note that the skin symptoms did not reappear when the patients were exposed to sunlight; Spies has emphasised the importance of applying this test before being certain that a cure has been effected.

CASE-HISTORY

A. B., a cabinet-maker aged 55, first came under observation in University College Hospital in March, 1937. He showed mild mental symptoms but no physical signs, and was diagnosed as a case of neurosis. There were no skin lesions. He remained in hospital for three weeks, but his weight decreased from 9 st. 5 lb. to 9 st. 1 lb. in that time on the ordinary diet. He was readmitted on June 9th, complaining that since he had been for a holiday to Ramsgate seven weeks previously he had felt very weak, and that his hands had got sunburned. He also had a soreness in his abdomen which had been noted ever since a gastro-enterostomy for a duodenal ulcer five years before. The so-called sunburn had come on after half an hour in the sun and was accompanied by the onset of diarrhœa and by his tongue becoming sore and peeling in large flakes. He was depressed, and had mild delusions of persecution.

Physical signs.—His skin was very dry, and when a glass slide was rubbed on his nose it was not smeared. His hands were red and peeling in patches, the redness stopping at a sharp border on his wrists. On his face and nose, and especially in his nasolabial folds, the sebaceous follicles were filled with horny plugs and were prominent. Fig. 1 shows the condition of the hands at this time. The corners of his mouth were sore and slightly cracked, and his tongue was red, shiny, and smooth. His abdomen showed slight, rather indefinite soreness on the lower right side, and with no rigidity. He weighed only 7 st. 5 lb., having lost about 2 st. in less than three months. Temperature and pulse-rate were normal. The blood pressure was 98 systolic and 62 diastolic. No abnormal neurological signs were detected. He was seen by Dr. W. N. Goldsmith, who suggested that he had pellagra and this diagnosis was confirmed by Prof. W. H. Wilson of Cairo. Details of his diet for the previous five years obtained from his wife showed that he was consistently under-feeding. His portions of food were stated to be very small.

The case seemed generally similar to the "secondary pellagra" which Levy Simpson has described as occurring in patients with gastro-intestinal lesions on diets that would not cause pellagra in a normal person (1935).

The patient's regular diet was as follows:—

Breakfast.—A glass of very hot water first thing each morning, with a pinch of salt in the water; occasionally has a little tea. Quaker oats made with water about 1½ tablespoons uncooked, and a "little milk every day." Sometimes a steamed egg as well. Has coffee and milk occasionally.

Lunch.—Cheese sandwiches—occasionally marmite sandwiches—and a glass of beer. Never eats cooked vegetables. Rarely eats salad.

Dinner.—A little chicken or fish and one potato; cheese, biscuits, and fruit; a pear, apple, or banana. Never oranges. Sometimes milk pudding.

The patient eats a special kind of "digestive bread" which the family has been taking for the last eight years It is a white bread that never goes stale. He eats 3 or 4 slices a day usually. He does not have milk more than twice a week, for he finds it indigestible. Recently, however, owing to his gastric trouble, he has been drinking about a pint a day.

It is difficult to assess this diet in terms of the filtrate factor. In the first place, there is a good deal

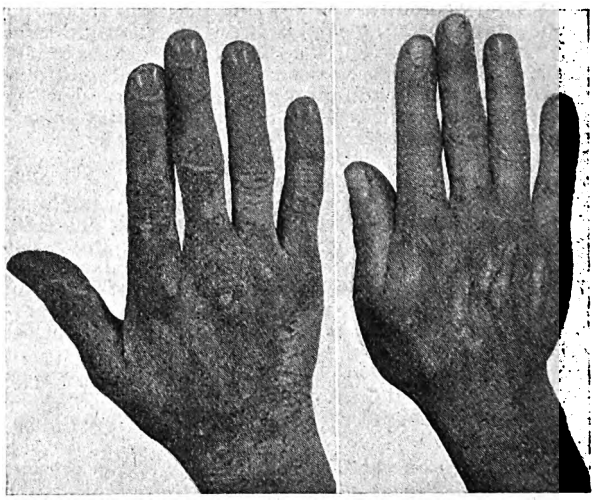

FIG. 1 (*left*).—Condition of the patient's hands on June 14th, five days after admission.
FIG. 2 (*right*).—Condition of hands on Nov. 19th after complete recovery.

of uncertainty about the actual amount of milk and marmite which the patient took; secondly, there is as yet little information about the amount of filtrate factor in these foods. The point is not of great importance in this case because the development of the disease and the rapid disappearance of the symptoms when filtrate factor was given are clear evidence that the previous diet, in spite of its containing milk and marmite, was insufficient for this patient with his gastro-enterostomy.

The following investigations were carried out.

A *blood count* showed hæmoglobin, 90 per cent.; red cells, 4,680,000; colour-index, 0·9; white cells, 6600 (polymorphs 49 per cent., lymphocytes 45 per cent., monocytes 5 per cent., mast cells, 1 per cent.).

Gastroscopy on June 14th showed gastritis but the stoma was not seen. The *stools* were examined for occult blood on four occasions with negative results; the total fat was 27 per cent., and the differential estimates normal. A specimen of *gastric juice* showed bile, blood, and mucus, with no free acid; total acidity, 12. A *barium meal* showed that the stoma functioned well; no organic lesion was seen, and no gastrocolic fistula. Food passed rather rapidly to the cæcum. Estimations of *sodium and potassium in the blood* were done after a week of treatment, and the values were normal.

The patient gave normal responses to the dark-adaptation test. Vitamin-A deficiency is therefore ruled out. The estimation of lactoflavin in the urine showed marked reduction both before and after

* Recent work in the United States has indicated that the action of the filtrate factor might be in part due to nicotinic acid. Fouts, Lepkovsky, Helmer, and Jukes (1937) have recently found that nicotinic acid caused almost as satisfactory a response in four pellagrins as did the administration of liver filtrate. In recent studies Smith, Ruffin, and Smith (1937) have reported that a case of pellagra responded rapidly to the administration of 60 mg. of nicotinic acid over a period of twelve days.

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treatment. He was found deficient in vitamin C to the extent that he did not excrete any excess until 2500 mg. had been given. The phosphatase in the blood was normal.

He was treated for a week with 35 oz. of milk a day, and for five days was put on a full "gastric" diet containing in addition small amounts of fish, eggs, and chicken. It is rather surprising that no improvement was noted, for this type of case often steadily improves with rest in bed and a milk diet. The amount of filtrate factor in rather less than a litre of milk was clearly not sufficient to effect a rapid cure. Treatment was then begun with a concentrated preparation of filtrate factor made from fresh liver by the following method:—

Fresh pig's liver in quantities of 7 kg. was minced and extracted by boiling with 10 litres of water acidified to approximately *p*H 5·5. The coagulated protein was removed by filtration, and the slightly opalescent filtrate was stirred vigorously with 100 g. of fuller's earth for one hour, and the earth removed by filtration. This treatment, repeated three times, is known to remove lactoflavin and B_6 by adsorption. The clear filtrate was evaporated rapidly to dryness under reduced pressure at 65° C., and the residue dissolved in water so that 1 ml. corresponded with 3·5 g. of fresh liver. The resulting solution was a brownish fluid with a rather pleasant meaty flavour.

From June 22nd the patient was given 70 ml. of the extract twice daily, corresponding to a little less than 500 g. of fresh liver. He found it appetising. Improvement was immediate and conspicuous. After three days papillæ were reappearing on his tongue, his appetite was better and the skin on his hands was no longer peeling. The mental condition was a little improved. On July 19th his skin, which had been very dry a day before, was quite greasy, and the tongue was almost normal. The blood pressure was still 98/62, and his weight was 8 st. 8 lb. On July 22nd he was allowed to sit in the sun for an hour with his arms exposed, without any effect. Treatment with the liver factor was stopped on July 24th and replaced by one drachm of Yeastrel, a yeast extract, three times a day. He then went to a convalescent home. The improvement of the hands is shown in Fig. 2.

When last seen on Nov. 6th the patient was scarcely recognisable, being mentally cheerful and normal; his skin was smooth and healthily greasy, the follicles were almost invisible, the tongue was normal, and his hands, though the skin was rather thin, were otherwise quite healthy. He had been much in the sun with no ill effect. His weight was 9 st. 10 lb. and blood pressure 140/90.

SUMMARY

A case is described in which pellagra developed in a man with a gastro-enterostomy who lived on an eccentric diet.

The pellagra yielded rapidly to treatment with a filtrate factor obtained by repeated adsorption of liver extract with fuller's earth.

The estimations were carried out in the laboratory of Dr. L. J. Harris at Cambridge. We are much indebted to him for his kind coöperation.

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A WARD EPIDEMIC OF SONNE DYSENTERY

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SPORADIC dysentery due to *Bacillus dysenteriæ* Sonne was recognised in England by Channon in 1926 and cases were later reported by Clayton (1927), Clayton and Hunter (1928), Howel Evans (1928), and others. The disease had already been recognised in Scotland in epidemic form by Fraser, Kinloch, and Smith (1926) and by Fyfe (1927), who described a typical milk-borne outbreak affecting about 150 people. Smith in 1931 reported 24 cases among 58 boys in a house at Rugby School.

The epidemic I am about to describe occurred in a ward of children who were in varying stages of convalescence from diphtheria. Of the 27 patients in the ward 15 were affected during the five weeks that the outbreak lasted, their ages ranging from eighteen months to twelve years.

On Feb. 2nd, 1937, a boy of five was admitted with a mild nasal diphtheria. His mother said he had had diarrhœa a few days before, but no importance was attached to this at the time. When admitted he had no diarrhœa, nor were his stools in any respect abnormal as far as inspection went. On Feb. 17th his temperature rose and he had a pyrexia of 100°–101° F. for two days, followed by the passage of an occasional normal stool (up to this date he had been having enemata every alternate day as part of the routine treatment). Appropriate steps were taken to isolate him in the ward but the cause of his pyrexia was unexplained.

From Feb. 17th to March 26th case followed case in spite of closing the ward to new patients and prompt isolation of each case as it occurred.

The numbers of new cases in successive weeks after the onset of the epidemic were as follows:

Weeks	*1st*	*2nd*	*3rd*	*4th*	*5th*
Cases	3	2	7	2	1

Five patients had each one relapse, making a total number of infections in any one week:

Weeks	*1st*	*2nd*	*3rd*	*4th*	*6th*
	3	2	9	3	3

The period between the primary attack and the relapse was 14–18 days in four cases and 31 days in one case. This last patient was the boy whose history has been given. The causal organism was first recovered from his stools during the relapse, five weeks after the primary attack.

SYMPTOMS

Of the 15 primary cases, 11 had a pyrexia of 100°–101° F. lasting from one to five days, generally two days. All had some rise in pulse-rate for a few days. Frequency of the stools, with mucus, was noted in 10 cases and 6 passed stools flecked with blood. There was vomiting in 2 cases only; nausea was much more common and loss of appetite was the rule. The children at the onset of their illness

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appeared listless and rather toxic, but often felt much better the following day. The abnormal stools were not passed when the child seemed most ill, but rather a day or so later when it appeared to be recovering.

The 5 relapses were all accompanied by a rise in temperature, but the symptoms were even milder than the primary infections. Vomiting occurred once, frequent stools three times, and mucus and blood were passed by two patients.

Complaints of abdominal pain were not made but palpation occasionally showed very slight tenderness. The general condition of none of the children gave rise to any serious concern, and treatment was of the simplest. The lack of objective physical signs was at first very puzzling, but even before the cause was realised one was struck by the uniformity of the clinical picture. Symptoms of respiratory origin were not encountered. They seem to be more usual in severe than mild cases (Hay 1930).

BACTERIOLOGICAL EXAMINATIONS

In 9 of the 15 cases *B. dysenteriæ* Sonne was isolated from the fæces. In all, 51 stool cultures from the 15 patients gave 10 positive results. Of these positives, 7 were the first specimen of a particular patient to be examined, 1 was the second, and 1 was the third. In 1 case the Sonne bacillus was obtained from the fourth stool examined, the first having been positive four weeks before; two intervening examinations had been made with negative results. In this last case the patient was evidently a temporary carrier for she had no symptoms after her first stool swab was examined.

Two cases were positive for Morgan's bacillus No. 1. In one of these the stool was positive for the Sonne bacillus on March 26th and for Morgan's bacillus on April 8th. It is clear that the best chance of isolating the organism is from a stool obtained as soon as possible after the onset of symptoms. Even a few days later recovery may be impossible.

A suspension of Sonne bacillus was agglutinated against the serum of 8 of the positive cases. Six agglutinated to 1/25 (2 in the third week, 2 in the fourth week, and 2 in the sixth week after their illness); 1 agglutinated to 1/50 (in the fifth week after his illness) and 1 was negative—i.e., less than 1/25 in the fourth week after his illness. The titre observed in this series emphasises how little reliance can be placed upon the agglutination reaction to establish the diagnosis in this type of dysenteric infection. Thus a titre of over 1/50 was encountered by Fraser, Kinloch, and Smith (1926) in only 12 out of 31 cases, and Nelson (1931) concludes that the diagnosis is best established by isolation of Sonne's bacillus from the stools and that although agglutinins are present in the serum in many cases, the titre is often too low to be of diagnostic value.

DISCUSSION

The mode of spread from case to case in this epidemic remained somewhat a mystery. Bed-spacing was entirely adequate. Patients were not allowed up during the epidemic, and barrier nursing was instituted in all affected cases. All feeding utensils are sterilised in an efficient steriliser after each meal in all the wards in the hospital. Bed-pans are similarly sterilised after use. The human factor cannot of course be ruled out; that some leakage had been taking place in spite of careful supervision was shown by the fact that a junior nurse had an attack of vomiting and diarrhœa lasting one day, the initial symptoms being suggestive of a mild infection.

The high infectivity of the condition has often been remarked. Mansell (1930) noted the rapid spread in a children's ward despite precautions. Felsen and Osofsky (1934) reported an interesting outbreak at the Bronx Hospital which involved the entire staff (nursing, kitchen, and even works) besides children in the wards. It is clear that if a case occurs in a ward the likelihood of cross-infection is as high as with any infectious disease, measles and chicken-pox included. Only by prompt isolation, or preferably removal, of each patient who becomes ill can the spread of infection be stopped.

The tendency to relapse has not been previously reported as far as I have been able to discover. That 5 out of the 15 cases had a clinical relapse indicates a fairly high liability. That these may have been reinfections cannot of course be denied. Hurst and Knott (1936) isolated Sonne's bacillus from one of their cases of ulcerative colitis by swabbing the ulcers under direct vision. This shows that the chronic carrier state is not unknown and it is perhaps more common than at present realised.

The mildness of the illness makes it one which is easily overlooked or diagnosed under such vague headings as gastric influenza or enteritis. Its high infectivity renders confusion with food-poisoning likely. Bacteriological examination of stool cultures, whilst clinching the diagnosis in any one case, fails to reveal the causative organism in many cases during an epidemic. Fraser, Kinloch, and Smith obtained positive stool cultures in 11 of their 33 patients. Smith (1931) found that only 9 of 18 cases in which the stools were examined gave positive results.

SUMMARY

Of 27 patients in a children's ward 15 contracted Sonne dysentery and 5 had relapses. The disease was highly infectious.

Bacteriological examination of stool cultures and the agglutination reaction will not establish the diagnosis in every case during an epidemic. Where they do not give conclusive results reliance must be placed on the clinical picture and for purposes of prevention the cases must be treated as if the diagnosis had been confirmed.

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INTERNATIONAL CONGRESS FOR PSYCHOTHERAPY.—The International Medical Society for Psychotherapy will hold its tenth annual congress from July 29th to August 2nd at Balliol College, Oxford, under the presidency of Prof. C. G. Jung (Zurich). The purpose of the society is to provide a platform for all schools of medical-psychological thought, and representatives of the British Medical Association, the medical section of the British Psychological Society, the National Council for Mental Hygiene, and the Child Guidance Council have been elected to the council which is arranging the meeting. Up to 1936 the society held its congresses in Germany. The 1937 congress met in Copenhagen; and so the 1938 congress is the first to be held in an English-speaking country. At the last congress it was decided that one of the main themes for discussion in 1938 should be psychotherapy at the various periods of life. The hon. secretary of the congress is Dr. E. B. Strauss, 81, Harley-street, London, W.1.

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ON THE CARBOHYDRATE METABOLISM IN 'ANOREXIA NERVOSA

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DETAILS of the glucose tolerance in a series of cases of anorexia nervosa were published in a previous paper (Sheldon 1937) and gave rise to some correspondence (Langdon-Brown 1937). In two instances the initial curve was of the "flat" type with low readings throughout, but on recovery it changed to the type often referred to as "mild diabetic." The initial flat curves were very similar to those that have been described in Simmonds's disease (Aitken and Russell 1934, Riecker and Curtis 1932). The published work about Simmonds's disease is at present in a state of extreme confusion since a large proportion of the cases reported under that name are in reality typical instances of anorexia nervosa, and the tendency to this flat type of curve is often adduced as evidence of the presence of a pituitary defect. In the previous paper already referred to it was pointed out that the work of Himsworth (1935) on the effect of previous diet on the shape of the glucose-tolerance curve offered a possible alternative explanation, and the opportunity was therefore taken of making a further study of the problem in the following patient.

CASE REPORT

An unmarried female aged 22. She was the eldest of five children. Puberty was delayed, the first signs of a change of figure not being noticed by the mother till she was over 14. Menstruation began at 16—after an operation for imperforate hymen—and was thereafter regular but scanty. At the beginning of 1934 (aged 18½) she had an attack of influenza—sore-throat, aching limbs, cough—and was away from work for six weeks. Soon after this the menses ceased, the last period being in March, 1934, and there has been complete amenorrhœa since. It is possible that she began to lose weight at the same time, but if so it was of small amount and gave rise to no anxiety. During the last twelve months there had been much loss of weight, from 8 st. 9 lb. to 5 st. 7 lb. This was the result of her habits for, working in a factory as a battery assembler, her average daily intake was as follows: Breakfast and lunch: "none, or just a cup of tea." Tea: "a good meal—perhaps an egg with bread and butter." Supper: "a heavy meal"—meat, vegetables, and pudding. The benefit of the last two meals was nullified by the fact that she was in the habit of retiring to the lavatory immediately they were finished, where she vomited the food. She denied that she had lost appetite, but it is clear that she was antagonistic to food. The mother added two further details, both of which are characteristic of anorexia nervosa. (1) She had become far more active and energetic than previously. Now, in spite of a day's work in a factory on practically no food, and the prospect of vomiting the evening's repast, she was in no way tired, but "was always on the go" and "would set to and turn the house out as if it had never been cleaned." (2) Her mood changed. Previously pleasant, the mother stated that she had now become "moody, irritable, quick-tempered, and nasty"—the latter to both parents. Attempts by her mother to persuade her to eat resulted in outbursts of anger, and the mother "was always in the wrong." Eventually the parents became worried at the steady loss of weight, and brought her to the out-patient department of the Royal Hospital, Wolverhampton, whence she was admitted an in-patient on August 3rd, 1937.

Examination.—A thin girl. Height 5 ft. 3½ in. Weight 5 st. 13 lb. Ordinary physical examination was negative. The breasts were scanty, the axillary and pubic hair normal; the external genitalia were fully developed and on pelvic examination the uterus was well developed. Blood pressure 95/50 mm. Hg. The basal metabolism was minus 40 per cent. Wassermann negative. Urine normal, urinary diastase 10 units. Radiogram of skull normal. Glucose-tolerance curve (August 6th) gave a resting level of 0·056 per cent. and after 50 g. of glucose the half-hourly readings were 0·068 per cent., 0·062 per cent., 0·086 per cent., 0·093 per cent., 0·112 per cent.—a curve starting low and only attaining a maximum of 0·112 per cent. after a slow rise. (Details of the various curves are tabulated in Table I.)

TABLE I—BLOOD-SUGAR AFTER GLUCOSE BY MOUTH (50 g.)

No.	Date in 1937.	Fasting level.	Blood-sugar (%) after ingestion of 50 g. glucose.				
			½ hr.	1 hr.	1½ hrs.	2 hrs.	2½ hrs.
1	August 6th	0·056	0·068	0·062	0·086	0·093	0·112
2	Sept. 1st	0·068	0·086	0·062	0·081	0·056	0·062
3	„ 8th	0·081	0·118	0·081	0·137	0·100	0·093
4	Oct. 12th	0·112	0·118	0·200	0·118	0·168	0·162
5	„ 19th	0·081	0·187	0·137	0·037	0·075	0·106
6	„ 26th	0·106	0·131	0·150	0·175	0·168	0·112

Further progress.—As a result of the new environment the patient became more cheerful than she had been at home, ate better, and the vomiting naturally ceased. During the next few weeks she rapidly gained weight, so that by Sept. 1st she had gained just over a stone, the weight reaching 7 st. The basal metabolic rate rose at the same time to normal (plus 7 per cent.). The weight thereafter remained steady.

CARBOHYDRATE METABOLISM

The holiday season prevented investigations during this period, but at the beginning of September it was decided to investigate the patient's carbohydrate metabolism. A glucose-tolerance curve taken on Sept. 1st showed the typical flat curve with low readings throughout that has been referred to already—a resting level of 0·068 per cent., with half-hourly readings after the ingestion of 50 g. of glucose of 0·086 per cent., 0·062 per cent., 0·081 per cent., 0·056 per cent., 0·062 per cent. There appear to be two alternative explanations for such a curve—either the sugar is dealt with more rapidly than usual after its absorption, or there is a failure of absorption. It is difficult to believe there is such a failure in anorexia nervosa, since clinically these cases gain weight as soon as their diet is increased. The possibility had to be faced, however, for the work of Verzár (1936) has shown that the absorption of glucose is dependent on its phosphorylation, for which the hormone of the suprarenal cortex is necessary, and a similar type of curve has been found in Addison's disease.

Since it has been suggested that in anorexia nervosa there is a failure of function of the anterior pituitary, it did appear to be possible that this type of curve in the present case might perhaps be the result of secondary failure of the suprarenal cortex, though there was no other evidence of such a state.

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Accordingly, without change of diet, a further glucose-tolerance test was performed on Sept. 8th, 10 c.cm. of Eucortone being given the night before, and 10 c.cm. one hour before the test was carried out. The resulting curve had a fasting level of 0·081 per cent., with half-hourly readings after taking 50 g. of glucose of 0·118 per cent., 0·081 per cent., 0·137 per cent., 0·100 per cent., 0·093 per cent. When plotted out (see Fig. 1) it will be seen that this curve is almost identically parallel to the previous one of the week before, though at a higher level.

The administration of cortical hormone did not therefore convert the curve to a normal one, and it is therefore extremely unlikely that the low flat curve in this case can have been due to interference with suprarenal function.

TABLE II—BLOOD-SUGAR AFTER GLUCOSE INJECTED INTRAVENOUSLY (20 g.)

—	Fasting level.	Time after injection (mins.).						
		10	20	30	40	50	60	70
Patient ..	0·093	0·293	0·206	0·200	0·162	0·156	0·125	0·131
Control ..	0·120	0·266	0·202	0·202	0·222	0·202	0·202	0·176

The patient's response to intravenous glucose was then investigated, and the results are set out in Table II, and the curves shown in Fig. 2. A control was carried out at the same time on a surgical convalescent of the same sex and approximately the same age as the patient. After the intravenous injection of 20 g. of glucose the behaviour of both

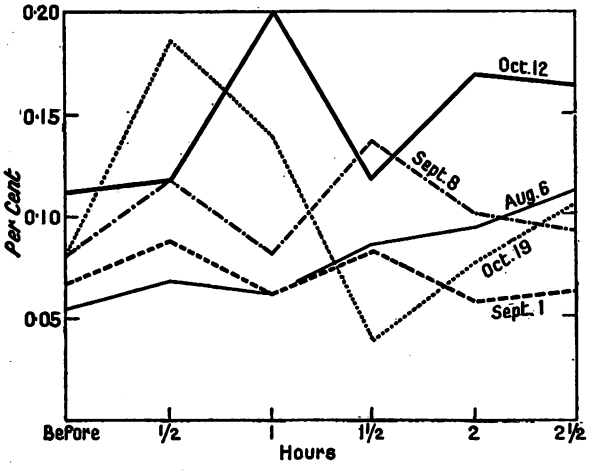

FIG. 1.—Blood-sugar curves showing (August 6th and Sept. 1st) typical flat curve of anorexia nervosa; and effect of (Sept. 8th) eucortone, (Oct. 12th) strict diet, and (Oct. 19th) patient's own choice of diet.

subjects was identical for the first 30 mins., but thereafter the patient disposed of her sugar at a somewhat faster rate than the control, though the difference is not great. The patient therefore had no difficulty in dealing with glucose once it had got into the body.

Since the curve after eucortone did not suggest a failure of absorption—and there is also no clinical evidence to suggest that this may be an operative factor—the result of the intravenous test suggested that the low flat curve might be explained by the work of Himsworth as the result of previous stimulation of the insulin mechanism after a high carbohydrate diet.

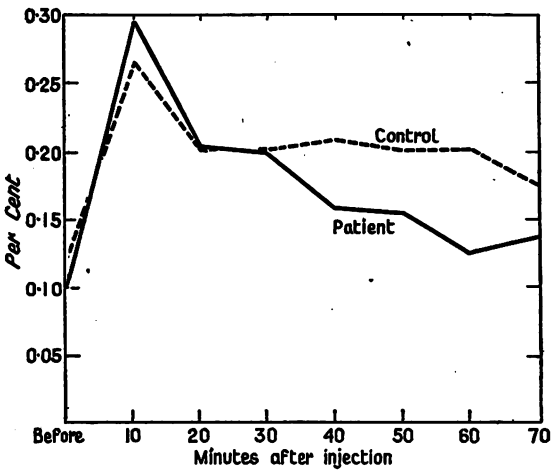

FIG. 2.—Blood-sugar curves after intravenous injection of 20 g. glucose.

The patient was therefore put for one week on a strict diet containing a daily allowance of carbohydrate 153·9 g., fat 67 g., and protein 66·5 g. She took the diet well and a further glucose-tolerance curve was done on Oct. 12th. The curve was no longer of the flat type, but showed a rise to a maximum of 200 mg. per 100 c. cm. in one hour with a sharp drop thereafter and a high secondary rise. The curve is quite different from anything she had previously shown, and as it had resulted from one week's control of the diet, it was decided for the next week to leave her to her own choice in the matter of food, provided that the total intake was sufficient to prevent loss of weight. It had been noticed by the sister that for some time after admission she had shown a preference for carbohydrates, in particular for cakes and sweets. It was hoped to round the observations off by the restoration of her old flat low curve following a return to her old habits of diet. Unfortunately for the experiment this did not occur, for when left to her own devices the patient ate practically the same diet as during the previous week, saying that she liked it. The resulting curve, taken on Oct. 19th, was a completely normal one, with a resting level of 0·081 per cent., followed by half-hourly readings after taking 50 g. of glucose of 0·187 per cent., 0·137 per cent., 0·037 per cent., 0·075 per cent., 0·106 per cent.

A fortnight of normal diet had therefore resulted in a normal curve.

It was then attempted to give her a high carbohydrate diet, with a daily allowance of carbohydrate 255 g., fat 48 g., and protein 51 g. The patient disliked this and rejected parts of it. The resulting curve taken on Oct. 26th is therefore of no particular interest—the figures are shown in Table I, but the curve is not shown in Fig. 1. As the patient had become restive during this week, it was not considered desirable to push the observations further.

DISCUSSION

In the case recorded above a patient with anorexia nervosa had initial glucose-tolerance curves which after the ingestion of 50 g. of glucose showed a rise of minimal amount. Curves of this low flat type have been found in other instances of anorexia nervosa (Sheldon 1937) and they have also been recorded in Simmonds's disease in cases where the diagnosis has afterwards been proven by autopsy (Aitken and Russell 1934, Riecker and Curtis 1932). Their presence in the latter disease has not unnaturally been explained as the result of the pituitary atrophy, which has removed a normal counter-balance to the action

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of insulin and allowed this to act unopposed. There is also a prima facie basis for this supposition in the fact that in some instances of Simmonds's disease an increase in the number of islets in the pancreas has been described (Gallavan and Steegman 1937, Gunther and Courville 1935). By analogy the same explanation has been advanced to explain the presence of a similar type of curve in anorexia nervosa, and is one of the factors that have led to the present widespread but mistaken belief that anorexia nervosa is really a polyglandular endocrine syndrome.

It is therefore a matter of some importance to investigate more closely the origin of this type of curve. The important work of Himsworth (1935) appears to provide a clue, and it was previously suggested (Sheldon 1937) that since the curves found in anorexia nervosa hardly fell outside the limits found by Himsworth in normal people after a period of abnormal diet, their appearance in anorexia nervosa might be the result of their previous dietetic behaviour, with a relative over-indulgence in carbohydrates. There was at that time, however, no evidence that could be offered, but the investigations on the present case show that this is indeed so. The flat curve is not due to failure of absorption of glucose, for the previous injection of eucortone merely gave a parallel curve with higher readings. The intravenous administration of glucose showed no defect in the insulin mechanism. During the initial part of the patient's stay in hospital she was encouraged to eat without particular emphasis on the exact quality of her diet, and her predilection for cakes and sweets was noted by the sister of the ward. A fortnight of normal balanced diet resulted in a normal glucose-tolerance curve.

Whatever may be the explanation of the flat curve in Simmonds's disease, it is at any rate clear that there is no need to invoke an endocrine explanation for its presence in anorexia nervosa. Since the origin of the low flat curve in this case was purely dietetic, it appears probable that the same cause has been operative in other instances of anorexia nervosa where this type of curve is found.

We desire to express our thanks to Dr. S. C. Dyke, pathologist to the Royal Hospital, Wolverhampton, in whose laboratory much of the work was done.

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CLINICAL AND LABORATORY NOTES

CORONARY THROMBOSIS IN A PATIENT UNDERGOING TREATMENT BY BILATERAL ARTIFICIAL PNEUMOTHORAX

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THE patient was a woman of 25 who was being treated for chronic pulmonary tuberculosis by bilateral pneumothorax, and she died in September, 1937, eighteen hours after a refill. She first attended Brompton Hospital in November, 1935, having been previously treated for pulmonary tuberculosis elsewhere.

Previous treatment.—The condition was diagnosed in March, 1935, the patient having complained of frequent colds. Tubercle bacilli were present in the sputum. A left-sided pneumothorax was induced in April, 1935. Satisfactory collapse was prevented from the first by extensive adhesions, and some of these were divided on two occasions before November, 1935.

Condition in December, 1935.—On her first attendance at the Brompton Hospital the patient's general condition was good, and she had no cough or sputum. There were, however, two large cavities in the left upper zone, with two apical adhesions preventing their collapse. Radiography showed a scattered tuberculous infiltration of the upper and middle zones on the right.

Treatment and progress.—The artificial pneumothorax was maintained, and in December, 1935, both adhesions were divided by Mr. J. E. H. Roberts. Complete collapse of the left lung, with massive collapse of the upper lobe, followed this operation.

Throughout 1936 the patient remained well, without cough or sputum, but in December there was radiological evidence of a cavity, with a fluid level, in the right upper zone. The cavity increased in size, and in January, 1937, a right-sided artificial pneumothorax was induced. A good selective collapse was obtained on the right side and a bilateral pneumothorax was maintained. There was evidence, however, of progressive obliterative pleuritis on the left side from April, 1937.

Final illness.—On August 25th, 1937, the general condition was satisfactory. There was massive collapse of the left upper lobe with mediastinal displacement to the left; a larger refill was given on the left side. A week later the mediastinum was central but the right lung had expanded, so a refill of 500 c.cm., which was the usual amount for this side, was given. There was no refill on the left on this day. The patient then appeared very well and was able to go home in the ordinary way. Ten hours after the refill, however, she complained of great dyspnœa with precordial discomfort but no pain. An injection of morphia and hyoscine gave relief, but eight hours after the onset of symptoms she became cyanosed, and died suddenly.

At the *post-mortem examination* the tuberculous lesions on both sides appeared to be quiescent. The presence of massive collapse of the left upper lobe was confirmed. The adhesions in both pleural cavities were even denser than had been expected. On examination of the inner surface of the ventricles a small area of yellowish degenerated heart-muscle was discovered. This was found to be due to a recent coronary thrombosis, an immovable ante-mortem thrombus being found in the corresponding branch of the posterior coronary artery. The remaining portions of the artery appeared normal.

If a patient with a balanced bilateral artificial pneumothorax complains of dyspnœa of sudden onset, the most probable cause is an added spontaneous pneumothorax. The possibility of absence of pain in spontaneous pneumothorax complicating bilateral pneumothorax has been pointed out before, but it is not as well known as it should be. Spontaneous pneumothorax has often been diagnosed in patients with bilateral pneumothorax, in the absence of pain, by observing an increase in the intrapleural pressures, when the patients have complained of dyspnœa. A small spontaneous pneumothorax on one side might be expected to cause dyspnœa when

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the other lung was collapsed, even if it did not cause enough increase in the intrapleural pressure on its own side to give rise to pain in the chest. On the other hand, a small spontaneous pneumothorax on the side of the artificial pneumothorax, in a patient with only one lung collapsed, would not be expected to cause dyspnœa of such a degree as to be an indication for testing the intrapleural pressure before this pressure had risen sufficiently to cause pain in the chest.

In this case the cause of the dyspnœa was the coronary thrombosis. The occasional absence of pain in this condition is, of course, well recognised.

ESTIMATION OF SULPHANILAMIDE IN BLOOD AND OTHER BODY FLUIDS

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(From the Wellcome Physiological Research Laboratories, Beckenham, Kent)

In view of the increasing clinical use of sulphanilamide (*p*-aminobenzenesulphonamide) a quick and reliable method of estimating its concentration in body fluids is obviously desirable in order that treatment may be satisfactorily controlled.

Fuller (1937) and Marshall, Emerson, and Cutting (1937) have already published methods for the estimation of sulphanilamide. Both these authors use a colorimetric method, utilising the diazo reaction to give a coloured compound. Fuller precipitates the proteins with trichloracetic acid, diazotises by the addition of sodium nitrite and couples the diazo compound with thymol in alkaline solution to give an orange yellow coloured dye. Marshall, Emerson, and Cutting precipitate the proteins with alcohol, acidify the filtrate with hydrochloric acid, diazotise and couple with dimethyl α-naphthylamine in acid solution to give a purplish red azo compound. The method to be described is a combination of the above two methods, and has been found to work satisfactorily in the Wellcome Physiological Research Laboratories. Trichloracetic acid is used as a protein precipitant and appears to be better than alcohol; it avoids the necessity of acidifying the filtrate before the addition of sodium nitrite, and of filtering the final coloured material before colorimetric estimation. Moreover, it obviates the use of large quantities of alcohol. Dimethyl α-naphthylamine is used for coupling with the diazotised sulphanilamide to give an azo dye. This reagent has the advantages of giving a colour in acid solution, of being more sensitive than thymol, and of producing less colour with filtrates from normal body fluids.

Method.—One millilitre of blood, or body fluid, is diluted with 2 ml. of distilled water; 1 ml. of a 20 per cent. aqueous solution of trichloracetic acid is then added, and the mixture filtered through a small filter-paper. To 1 ml. of the filtrate is added 0·05 ml. (one drop) of 0·5 per cent. sodium nitrite solution. After three minutes 0·5 ml. of a 1·0 per cent. alcoholic solution of dimethyl α-naphthylamine is also added, and the whole mixed by gentle shaking. After standing for fifteen minutes to allow the colour to reach its maximum intensity, the colour is compared with that obtained by treating in a similar manner standard solutions containing known quantities of sulphanilamide. The comparison may be done in any of the usual forms of colorimeter.

When a large number of estimations are done over a period, it has been found convenient to prepare permanent standards. These are prepared either from solutions of phenol red in phosphate buffer, or, in the case of those corresponding to concentrations of less than 0·01 mg. per ml., from solutions of cobalt sulphate in dilute sulphuric acid. These colours are almost identical with those obtained by the diazotisation of sulphanilamide and coupling with dimethyl α-naphthylamine. The standards are kept sealed in small test-tubes of a non-alkaline glass, ½ inch by 4 inches in size, and remain constant in colour for a very long time. A suitable range of standards is one equivalent to 0·1, 0·05, 0·025, 0·01, 0·005, 0·0025, 0·001 mg. per ml. of sulphanilamide in the original material. The colours are matched in a comparator, the material to be tested being diluted with known volumes of distilled water to correspond with one of the standards. By this method it is easy to estimate the sulphanilamide to within 10 per cent., an accuracy suitable for most biological purposes.

SUMMARY

A routine method (using trichloracetic acid, sodium nitrite, and dimethyl α-naphthylamine) is described which has been found to give satisfactory results over a long period in the estimation of sulphanilamide in blood, milk, cerebro-spinal fluid, and urine.

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TUBERCULIN- AND SCHICK-TESTING

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Parish, O'Brien, and others[1] have drawn attention to the misleading and fallacious results which may be obtained when the same syringe is used for the injection of tuberculin and Schick toxin, owing to the former substance's extraordinary power of adhering to glass.

—	No. of cases.	No. Schick-positive 8–10 weeks after injection.	Remarks.
GROUP A.—*Sanatorium Cases*			
(*a*) Single dose of alum toxoid (0·5–1 c.cm.)	56	25 (44%)	Same syringe used for Schick- and tuberculin-testing.
(*b*) Two doses of alum toxoid (0·2 and 0·5 c.cm.) at 2 weeks' interval	25	8 (32%)	
	81	40·7%	
GROUP B.—*Clinic Cases.*			
(*a*) Single dose of alum toxoid (0·5–1 c.cm.)	265	12 (4·5%)	Syringe used for Schick-testing only.
(*b*) Two doses of alum toxoid (0·2 and 0·5 c.cm.) at 2 weeks' interval	119	6 (5%)	
	384	4·6%	

Since mistakes in technique are sometimes of interest to others, the following results of the immunisation against diphtheria of two groups of children of approximately the same age distribution are possibly worth recording.

[1] *Brit. med. J.* 1935, 1, 1018.

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Group A (see Table) is composed of children at a sanatorium for non-pulmonary tuberculosis where a considerable amount of Mantoux-testing and diphtheria immunisation is done. In this group the same syringe was used both for tuberculin- and Schick-testing and it will be seen from the Table that 44 and 32 per cent. of the cases were Schick-positive when retested 8–10 weeks after (*a*) the one-shot, and (*b*) the two-dose method of giving alum toxoid, with a positive rate of 40 per cent. for the two methods combined.

Group B is composed of children from a diphtheria immunisation clinic where the Schick-testing is done with a syringe used solely for this purpose and it will be seen that less than 5 per cent. of these cases were Schick-positive after alum toxoid, given by the same two methods as in the previous group.

The children at the sanatorium were all known to be Schick-positive before the injection of alum toxoid, whereas those under seven years of age at the clinic had not received a preliminary Schick test, and this might result, no doubt, in a slightly higher rate of positive Schick-reactors amongst the sanatorium cases. The two groups, therefore, are not strictly speaking comparable in this respect or in numbers, but the differences in the results seem far too great to be thus accounted for. Differences in the potency of the various preparations of alum toxoid on the market must also be taken into consideration, but the results tabulated include only cases which received one or other of two proved and reliable brands.

It seems probable, therefore, that the striking difference between the results in the two groups of children is to be accounted for by contamination of the syringe used at the sanatorium with tuberculin and that many of the supposed positive Schick tests were in fact positive tuberculin reactions.

It might perhaps be asked why, if the syringe used for Schick-testing was contaminated with tuberculin, were not all the sanatorium cases pseudo Schick-positive? The explanation, no doubt, is that some of the sanatorium cases were not tuberculous and therefore insensitive to tuberculin in any dilution, whilst others, although suffering from tuberculosis, did not react to the minute quantity present in a contaminated syringe.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTIONS OF RADIOLOGY AND OF OBSTETRICS AND GYNÆCOLOGY

Dr. R. E. ROBERTS, president of the section of radiology, took the chair at a joint meeting of these sections held on Jan. 21st, and a discussion on

Radiotherapy in Non-malignant Gynæcological Disorders

was opened by Dr. W. M. LEVITT. He said that the time had come to formulate with some precision the indications and contra-indications for the radiotherapy of fibromyoma. X rays had given good results for over thirty years; the bleeding stopped, and the fibroid was reduced in size, and sometimes even disappeared. Radium probably gave similar results. Symptoms were completely relieved in almost all cases. The mode of action was not properly understood except that it was mainly through the ovaries. Consistently good results postulated sterilisation, which was equally effective without direct irradiation of the fibroid. Radiotherapy was, however, excluded in all patients under 40 unless the condition was so extensive as to make a successful pregnancy impossible. The patient's reproductive age, not her actual age, should be taken into account. With this reservation, radiotherapy was the treatment of choice for the great majority of patients over 40, especially as a major operation was the alternative.

The contra-indications applied only to a small minority of cases. They included very large fibroids causing pressure symptoms, and acute complications. These conditions did not introduce danger but only delay. On the other hand, clinical evidence of degeneration in the fibroid forbade the use of radiotherapy. X rays were preferable to radium for most cases. They could be given with much greater comfort and needed no hospitalisation, anæsthetic, or intra-uterine procedure. The mortality was nil. With radium the mucous membrane of the uterus received a very high dose compared with the dose required by the ovaries. The time occupied was about the same. X ray treatment needed a week only, for repeated series of treatments were no longer given. High-voltage X rays were now invariably used and given in six daily applications. Patients over 30 could be treated by planned sterilisation in a single day, but the X ray symptoms might be considerable.

Another important indication for radiotherapy was endometriosis. The radiologist must consider whether he could destroy the tumour by direct irradiation or whether sterilisation was also necessary. Most authorities stated that sterilisation was unavoidable except where the tumour could be completely excised. Interstitial radium therapy might produce better results than local X rays, and sterilisation might be avoided in certain cases, especially when the disease was situated in the rectovaginal septum and therefore at a safe distance from the ovaries. When an artificial menopause had to be produced, radiotherapy was better, for its action could be temporary, at least in patients under about 40. X rays were preferable to radium, for the irradiation could include the lesion.

Radiotherapy was also the method of choice for irregular function and hæmorrhage at or near the menopause, but in younger patients it was subject to the same limitations as for fibroids. Only in rare cases, such as grave hæmorrhage in puberty, should the rule be relaxed. Some chronic inflammatory conditions such as tubercle, actinomycosis, and gonococcal infections were sometimes treated abroad by weekly small doses over a long period. Radiotherapy carried out on modern lines could not possibly produce malignant change.

Dr. J. F. BROMLEY spoke of the radiotherapy of extra-uterine conditions. He explained the modern view of menstruation as an expression of the periodic activity of certain endocrine glands, and as a frustrated pregnancy. The activity of the ovaries and other reproductive organs was maintained and controlled by the anterior lobe of the pituitary. A variety of hormones were ascribed to different cells of the pituitary, and various diseases were associated with faulty balance of these secretions. Radiotherapy gave good results in many cases of acromegaly, especially in relieving the unbearable headache associated with it. The stigmata, however, were unaffected. Headaches due to swelling of the pituitary gland

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within its narrow bony cage could also be relieved by X ray treatment. Radiation was never a stimulant but always a depressant. Menopause, physiological or artificial, was associated with considerable over-activity of the pituitary, and its symptoms could sometimes be arrested by pituitary irradiation. The anterior pituitary hormone might also cause disturbance by stimulating the adrenals, thyroid, and parathyroid. Cushing's syndrome seemed to be caused by hyperplasia of the basophil cells and not to be cortico-adrenal. Hypertrophy of the parathyroid causing bony atrophy and an increased output of calcium could sometimes be relieved by X rays. The improvement of the mental depression alone was very striking in irradiation for pituitary disorders. In the treatment of excessive uterine bleeding the gynæcologist and the physician should coöperate closely with the radiologist and the exact dose should be carefully considered, and also the particular gland which must be treated. Menorrhagia was often caused by hypersecretion of the sex hormones, and direct irradiation would sometimes arrest the function of the ovary. Minimal doses combined with endocrine therapy had been found effective in some cases. Gynæcologists were accustomed to treat metropathia hæmorrhagica with a radium tube in the uterus. This condition was sometimes associated with the failure of a ripening follicle to rupture and therefore with the absence of the luteal hormone. The relief of symptoms might be due to depression of the œstrogenic function of the ovary. This would provide an argument for the use of X rays rather than radium.

Mr. LEONARD PHILLIPS delivered a critique of the value of radiotherapy, based on his own experience and on the study of some fifty published papers. His conclusions were summarised in a number of concise charts. Most authorities were agreed, he said, on the value of castration doses in menopausal menorrhagia. The mortality- and morbidity-rates were lower, the recovery time was shorter, and there was less visible trauma and less hospitalisation than after surgery. Radium produced a definite morbidity with disturbances of metabolism, peritonitis, and uræmia, but the death-rate was well under 1 per cent., a very low figure compared with that of most series of subtotal hysterectomies. The morbidity of surgery was also greater. Ulceration of the cervix and vaginal prolapse called for operation. The advantages of radium were a less destructive action on the ovaries and the possibility of control by the gynæcologist.

Mr. Phillips dealt with sources of error in diagnosis and the special investigations that ought to be made; with the dosage and filtration; and with the controversy of whether radium acted on the ovaries or the endometrium. A castration dose of X rays would, he said, induce menopause over a longer period and more gradually than radium, and would therefore lead to fewer disorders. It was suitable for large tumours and not contra-indicated by pelvic inflammation. Radium, on the other hand, gave an opportunity for examination under anæsthesia which was valuable in doubtful cases, and the preliminary dilatation and curettage would exclude carcinoma and sloughing fibroid polypi. These procedures could, however, also be carried out before X ray treatment, and the only decisive advantage of radium was therefore its smaller destructive effect on the ovarian tissue.

Irradiation antedated the menopausal symptoms but probably did not much increase their intensity. Statistics of very large series of cases of fibroids combined with menopausal menorrhagia showed a successful result in about 90 per cent. Among the contra-indications to radiotherapy Finzi had mentioned an age below 38, associated carcinoma and inflammatory disease, sloughing or large fibroids, and calcification. The literature showed very wide differences of opinion; the lists of radiologists were very short and those of gynæcologists very long. Opinions on the relative width of indication for radiotherapy and operation varied from 10 to 90 per cent. both ways. The surgical results would, of course, be far less favourable in the hands of an occasional operator. Some gynæcologists said that cancer developed after treatment by radium, and alleged an incidence varying between 0·3 and 3 per cent. Substerilising doses were chiefly used for intractable menorrhagia in young women. The percentage of cure was high; on an average over 75 per cent. A small dose was usually given at first, and was followed after an interval of some months by another similar dose, the total not exceeding 800 mg. hours. The disadvantages were the difficulty of correlating dose and effect and the danger of producing amenorrhœa, especially in women between 30 and 40. There was no danger to future labour from cervical scarring, nor of deformity or abnormality of the fœtus in later pregnancies. Among the chiefs of 32 leading European and American clinics, however, 12 only used radium and the others were definitely against it.

The results of so-called pituitary stimulation, sometimes combined with ovarian irradiation, showed slightly over 50 per cent. of successes. In his own cases of amenorrhœa, menorrhagia, and irregularity, Mr. Phillips said that the results were disappointing but the headaches were relieved. In miscellaneous cases they were better. The problem of endometrioma was very difficult, as most of the women wanted children and the diagnosis could only be confirmed by a laparotomy. Surgery offered the best prospects because it was conservative and not destructive.

Miss LOUISA MARTINDALE summarised the results of 878 cases of metropathia hæmorrhagica, fibrosis uteri, and fibromyomata of the uterus. Of these, 471 were treated by surgery with a success rate of 64 per cent., and 407 by radiotherapy, with success in 46 per cent. The surgical mortality was 1·9; malignant disease had been found in 14 cases but these, of course, had been in the worse group, for patients who had not been expected to develop complications had been irradiated. X rays had been used in 298 cases, chiefly in older women, for it was difficult to give a castration dose to a young woman. Answers to questionnaires showed that 41 per cent. of patients who had undergone hysterectomy with removal of one ovary had had no flushing; the percentage in those treated by X ray therapy had been 28 and by radium 36. The advantages of X ray treatment over radium were great. It produced no morbidity and was very short; there was no stenosis of the cervix, and no evidence that the treatment did any harm to later offspring.

Mr. MALCOLM DONALDSON declared that in purely gynæcological non-malignant conditions the radiologist was practically superfluous. Radiation acted on the ovaries, and the only justification for the treatment with small doses which had been described by previous speakers had been the belief that the rays had no effect on subsequent pregnancies and generations. This harmlessness had not yet been proved. The researches of geneticists showed that

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and films are reproduced showing the anterior, middle, and posterior commissures, the anterior cerebral artery, and what the authors cautiously describe as "a structure corresponding in size, shape and position to the oculo-motor nerve." The bibliography is extensive but contains no reference to the important work of Lysholm, and such is the rate of progress of diagnostic methods to-day that tomography has already been applied to encephalography so that we may expect that fresh refinements in interpretation will soon need to be chronicled.

The book is well produced and should be in the hands of radiologists, neurologists, and neurosurgeons, all in fact who are concerned in the localisation of space-occupying intracranial lesions.

Food Tables

By V. H. MOTTRAM, Professor of Physiology, King's College of Household and Social Science, University of London; and ELLEN M. RADLOFF, Lecturer in Physiology, University of the Witwatersrand, Johannesburg. London: Edward Arnold and Co. 1937. Pp. 63. 5*s*.

THERE is always a steady demand from dietitians and others who have to deal with human nutrition for tables setting out the composition of food. At one time scientists in this country were singularly backward in making the necessary analyses and so allowing these requirements to be met, but it is probably true to say that in the last ten years this deficiency has been almost made good. The authors have accordingly set out to collect the most important information on the composition of English foods and to give it in a form suitable for practical use. Their task has been a relatively easy one, for there are only a few important sources of information. The tables will no doubt prove a useful vade-mecum to dietitians, but it is a pity that the authors and publishers did not take a little more trouble over the job and make it a really good one. It would seem, for instance, that figures for sodium, chlorine, and potassium should have been included as well as those for calcium, phosphorus, and iron. The first three may be very important to hospital dietitians. Again, the figures are often given to decimal places which are quite meaningless; the authors admit this in the preface but have not taken the trouble to set the matter right. The data for the minerals in flour, milk, and eggs—staple English foods—have been copied from American sources; it is difficult to believe that reliable English figures could not have been obtained. As a matter of fact data for some of these foods may be found in the English sources from which the authors have already extensively drawn. Side by side are given hopelessly discordant figures for the amount of iron in egg yolk; could not the authors have found out, experimentally if necessary, which was the more reliable? If as we anticipate a second edition is called for, these matters will, we hope, receive due consideration.

The Psychology of Eating

By LEWIS R. WOLBERG, M.D. London: George Harrap and Co. 1937. Pp. 321. 8*s*. 6*d*.

THIS volume, evidently of American origin, is written in the light-hearted and popular manner which has become familiar to those used to the volumes on dietetics emanating from that country. It makes no attempt, beyond a generous bibliography, to deal with dietetics in a scientific manner. It contains much wisdom and a considerable number of platitudes, and details of such diets as must necessarily be of little value in a land where eggnog, soya muffins, strudel, and beef Carthusian style are not available to the general public.

Dietetics Simplified

By L. JEAN BOGERT, Ph.D., Consultant in Nutrition, Delineator Institute, New York. With Laboratory Section by MAME T. PORTER, M.A., Head of Home Economics and Nutrition, Department of Public Welfare, Utica, N.Y. London: Macmillan and Co. 1937. Pp. 633. 12*s*. 6*d*.

THE work of two dietitians, this book is packed with facts for those requiring details about food and foodstuffs. The principal author has been an instructor in medicine, and the more medical sections show a welcome gift in writing on abstruse subjects in simple language. It makes a useful reference volume.

A Textbook of Medicine

Fourth edition. Edited by RUSSELL CECIL, A.B., M.D., Sc.D., Professor of Clinical Medicine, Cornell University, Associate Editor for Diseases of the Nervous System; and FOSTER KENNEDY, M.D., F.R.S.E., Professor of Neurology, Cornell University. London: W. B. Saunders Company. 1937. Pp. 1614. 40*s*.

Prof. Cecil has enlisted the services of many new young authors and has managed to control a team of 143 contributors in such a way as to avoid repetition. This in itself is no mean achievement. It is in the newly discovered country or on ground that has recently been replanted that text-book guidance so often fails to be effective, but here the sections on recent work—such as that on influenza or the classification of purpura—are unusually explicit and helpful. The book is well planned, its contents being divided first ætiologically and then grouped in systems. A small-print summary of the history of certain diseases is included, and the references at the end of each chapter are carefully chosen. A few omissions may be noted; for example, air replacement in the treatment of pleural effusion, myxœdema heart, and the myotonic pupil should find mention in so substantial a volume. The differences in nomenclature, and occasionally in outlook, would make us hesitate to recommend this as a suitable book for the student working for a qualifying degree in this country, but it provides for his seniors a good consensus of medical opinion in America.

Clinical Chemistry in Practical Medicine

Second edition. By C. P. STEWART, M.Sc. Dunelm., Ph.D. Edin., Lecturer in Biochemistry, University of Edinburgh; and D. M. DUNLOP, B.A. Oxon., M.D., F.R.C.P.E., Christison Professor of Therapeutics and Clinical Medicine in the University. Edinburgh: E. and S. Livingstone. 1937. Pp. 372. 10*s*. 6*d*.

THE second edition of this book will be found, like its predecessor, an extremely useful manual within its particular province, which is to present a simplified account of some biochemical methods and interpretations as applied to diagnosis, treatment, and prognosis in clinical and general practice. Much new matter is included in the present volume, though one could wish that a few of the tests had been more stringently revised in the light of modern views. No

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mention is made of the importance of plasma phosphatase determination as an indication of liver function, although the variation in the amount of the enzyme present in the blood in bone diseases has not been overlooked. Under the heading "liver function" the description of the various types of Van den Bergh reaction may strike the reader as a little dogmatic. Some of the normal values given on pp. 234 and 360 might be considered misleading. However, in all books of this type, which endeavour to cover a wide field in the space of a short and readable volume, it is essential for the reader to bear in mind that many apparently clear-cut statements will be in fact only a sort of average of conflicting data and opinion. With this reservation in mind, the clinical reader and practitioner should find this a valuable and stimulating work.

British Journal of Surgery

THE January issue contains the following articles :—

EVOLUTION AND DEVELOPMENT OF SURGICAL INSTRUMENTS. By C. J. S. Thompson (Royal College of Surgeons). An account is given of the evolution of the surgical saw from the flint saw-blade of the Egyptians to the amputation saws of Butcher, Fergusson, and Lister in the nineteenth century.

VASCULAR ENDOTHELIOMA OF THE LUNG. By A. Tudor Edwards and A. Brian Taylor (London). The first four cases to be reported are described. The pathology is well established. Removal by lobectomy was in each case successful and all patients are alive and well.

RIGHT "DUODENAL" HERNIA. By Milroy Paul and W. C. Osman Hill (Ceylon). A case is described of a hernia of almost all the small intestine into a hernial sac, the mouth of which lay in the root of the mesentery and was related to the superior mesenteric artery. The origin of these herniæ and their anatomical relations are discussed

TWO CASES OF CONGENITAL MICROCOLON. By J. V. Ewing and W. E. Cooke (Wigan). Both cases were in first children, males aged 3 days at death. They were admitted to hospital after much vomiting and dehydration, and died after operation. Grieg's theory of causation is favoured—viz., achalasia due to defect of the autonomic nervous system.

CHRONIC REGIONAL COLITIS. By T. G. Illtyd James (London). The symptoms and operative findings were those of Crohn's disease—a chronic, non-specific inflammation of the intestine—and of his first clinical type, which is that of chronic intestinal obstruction. Resection of the affected gut is advised and was here successfully carried out.

ACUTE REGIONAL ILEITIS: A REPORT OF TWO CASES, WITH BACTERIOLOGICAL FINDINGS. By Robert Mailer (Glasgow). Two examples are reported of the acute type of Crohn's disease, one of which closely mimicked appendicitis, while melæna and acute colic were present in the other. Conservative treatment is advised. *Streptococcus viridans* was cultured from the blood in one case, and from the throat in the other.

CHRONIC INFLAMMATORY "TUMOURS" OF THE GASTRO-INTESTINAL TRACT. By F. G. Ralphs (Ashton-under-Lyne). Two cases are described, one of an inflammatory mass which was successfully removed by ileocolic resection, the other of an irremovable mass involving the pelvic colon. The mucous membrane is suggested as the point of entry of the infection. The pathology is discussed.

CROHN'S DISEASE OR REGIONAL ILEITIS. By Sir Lancelot Barrington-Ward and R. E. Norrish (London). It is suggested that this is a new disease. Its ætiology, pathology, and clinical features are discussed in some detail. Palliative treatment is of little value. One stage resection was successfully carried out in two cases, both of the chronic type, one of which showed ulceration of the mucosa.

BRAIN ABSCESS. By Gilbert Horrax (Boston). The distinction is made between the acute and multiple abscess, with a hopeless prognosis, and the chronic single abscess, which is usually encapsulated. A method of operation is described in which the abscess is made to present itself at the cranial opening and is exteriorised and drained as an external cavity. The results are good.

TORSION OF THE TESTICLE. By J. Lambert (Wellington) and R. E. Smith (Rugby). Clinical histories are given of nine cases. The main symptoms are acute abdominal pain and swelling of the testicle. Manual untwisting was frequently successful. Atrophy may follow, and in some cases fixation of the testicle in the scrotum is to be advised.

SURGERY OF THE PINEAL ORGAN. By Cecil P. G. Wakeley (London). The evolution and development of the pineal gland are described. The methods of operative approach are described (1) through the corpus callosum, and (2) through the lateral ventricle; and case reports are given of nine cases.

FRACTURES OF THE SHAFT OF THE FEMUR. By Eric L. Farquharson (Edinburgh). Reduction by screw traction in a special apparatus is described. An unpadded plaster cast is applied and the limb is suspended with slight continuous weight traction.

PNEUMATOCELE CAPITIS. By J. B. G. Muir (Tongshan, China). As a result of mastoid infection in childhood, air had escaped under the pericranium and had gradually raised the pericranium over the entire skull. There was also a communication into the extradural space in the posterior cranial fossa.

RECURRENT INTUSSUSCEPTION OF THE JEJUNUM. By William Gissane (London). A submucous lipoma caused recurrent attacks in an adult. The condition was cured by resection of the affected bowel.

LATENT CARCINOMA OF THE PROSTATE. By D. McGavin (London). The long period during which malignant disease of the prostate may remain quiescent means that it may come to operation late. Pre-operative diagnosis of malignancy should alter the nature of the operation.

INTERLOCKED ARTICULAR PROCESSES COMPLICATING FRACTURE-DISLOCATION OF THE SPINE: A SURVEY OF RECENT CASES TREATED BY OPEN OPERATION. By Alan H. C. Munro (Newcastle-upon-Tyne). One vertebral body is dislocated forward and its intact articular processes rest on the laminæ of the vertebra below. The spinal column is locked in a position of kyphosis. Three cases have been treated by open operation.

FRACTURED LUMBAR SPINE WITH UNILATERAL DISLOCATION. By A. Wilfred Adams (Bristol). The inferior articular process of the fourth lumbar vertebra had jumped over the superior articular process of the fifth on the right side, and was lying on its lamina. Reduction was effected by open operation. Good function was restored.

FRACTURE OF THE OS CALCIS. By W. J. Eastwood (Liverpool). A review of 47 cases are reviewed, of which the majority were treated by simple immobilisation after moulding of the arches of the foot, but without attempt at anatomical reduction. This gave good results.

MALIGNANT DISEASE OF THE LARGE INTESTINE. By Sir John Fraser (Edinburgh). A critical review of recent progress, with consideration of tumour grading; early diagnosis and prognosis; and the type of operation most suitable for disease in different sites.

INTESTINAL STRANGULATION: THE DEPRESSOR PROPERTIES OF THE PERITONEAL TRANSUDATE IN INTESTINAL STRANGULATION. By W. d'A. Maycock (Royal College of Surgeons). The depressor properties are shown to be accounted for by the amounts of histamine and choline present; but the toxic action of the transudate are not sufficient to account for the circulatory collapse.

An account is given of a visit to the MAYO CLINIC, ROCHESTER, U.S.A., with impressions of the general working of the clinic, and in particular of the work of the surgical staff.

There are also short notes on rare and obscure cases.

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THE LANCET

LONDON: SATURDAY, JANUARY 29, 1938

THE DEAD HAND

OUR title is derived from Sir WALTER LANGDON-BROWN'S mellow and provocative lecture appearing on p. 277. It is the dead hand of authority, whose baleful and retarding influence he traces through the history of medicine since the days of GALEN, and finds still too potent amid all the activity of modern less leisurely times. One idea in medical thought, once accepted and established, comes so to dominate men's minds that the next new and fruitful theory seems from its very freshness to be incompatible with the first, and is greeted with apathy, ridicule, opposition, anything but sympathetic encouragement. It is no fault in the first idea itself, which has served its day and generation well, but rather a rigidity of mental attitude which, in retrospect, allowed morbid anatomy for example to hinder the early growth of bacteriology, bacteriology in turn to make the idea of vitamins and deficiency diseases look silly, and pathology and biochemistry, now in their flourishing heyday, to make us still quite doubtful about the respectability and usefulness of the upstart psychology.

Sir WALTER'S thesis may rouse a protest. He deplores the struggles that every new and good idea had to go through before it could hold up its head among its elders. But those struggles were its stimulus; they made it grow strong and clear and influential; there is nothing like a little opposition for evoking the best effort from an idea, or—which is the same thing—from its protagonists. And think what a rabble of bad ideas, shallow and weakling things, have been broken and crushed by that same sound authority, prevented from growing into bombastic or misguided nuisances. There is a survival of the fittest in the evolution of thought as well as in the plant and animal world, and one test of the fit is its successful challenge of authority. Let authority remain then, duly and properly constituted, and the world will be a better place in the long run. Nevertheless the majority of those who read Sir WALTER will, we hope, in greater measure or less agree with him. There can be too much of some good things and he makes it appear that authority is one of them. So long as he is talking about the great minds of the past, or the present, those who make the classic contributions to the sum of truth, his argument seems remote from the daily preoccupations of practising doctors, and students and teachers of medicine. But it is not so. For the flowers of genius grow in the same earth and air as the common grass around them, and both are influenced in their peculiar ways by their common climate. Sir WALTER goes on to suggest that authority plays too powerful a part in ordinary medical education, and that we would do well to restrain it a little and give more attention to freedom and the uses of freedom. From his experience on curriculum committees he commends some of the steps that have been taken in that direction and more that have been proposed: better general education and a higher standard at entry for medical students, less of the minutiæ of anatomy, more adaptation of the teaching of anatomy and physiology to the problems and material of medicine and surgery. He says we could do more to develop, in students and doctors in general, the balanced combination of critical judgment with an open mind.

We might begin by looking at some factors that tend to perpetuate unquestioned authority in the medical schools. Tradition has set a great gulf in status between the medical student and the member of the hospital staff. The physician or the surgeon stands on a very high pedestal; he often enjoys standing there, and while he may condescend and be friendly he seldom tries very hard to come down and meet his students more nearly on a level. Every word he says on a ward round is usually accepted unquestioned by his hearers, and since he is human the experience is pleasant. Sometimes his words are a clear statement of his own experience, and deserve acceptance. But sometimes they are just what he has always thought, without ever inquiring how well-founded the view is, or at other times they make a tempting generalisation on inadequate grounds. No teacher, however well meaning, can keep pruning his teaching of error if he teaches a respectful uncritical audience. Yet there are few ward rounds in which the clerk dares to ask the physician, "How do you know that?" A more informal atmosphere, and incidentally the interdiction of sarcasm as a weapon against any but the lazy, would go far to liberate the student from the trammels of authority. A great deal of teaching is done by junior men, especially registrars. They too value their status and lay down the law with confidence: much of what they say in matters clinical is on someone else's authority, for their own experience is still meagre, and—such is the tendency of both teacher and taught to follow the line of least resistance—the most successful of them and the best appreciated is he who is most clear, most confident, and most dogmatic. The same criticism applies with even greater force to the writing of text-books by young and relatively inexperienced men; the motive, legitimate enough, is largely reputation, but the result is too often a perpetuation of accepted views which have not been redissolved and recrystallised from experience.

Authority, it is true, cannot be dispensed with, nor can any one teacher ever hope to be able to justify from his own experience every statement and every theory that he puts forward; still less can any student be left, unsupported by his elders, to learn all his medicine first-hand from patients. But it were well that every teacher should indicate the sources of his teaching. Is this borne out by his own experience, like the action of digitalis on

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the heart in fibrillation, precise and measurable? Is it an impression he has formed, or an old tradition, or a claim he has heard or read, which is worth remembering and testing by future observation, or which perhaps is scarcely susceptible by present methods of convincing scientific proof? Is it the experience or the theory of investigators whom he can quote, whose evidence and argument he considers trustworthy? If these distinctions were more frequently emphasised, both by teachers and by examiners, in medicine, the intelligent student's mind would play more constructively and more critically on the material put before him. More too might be done to teach him to use the periodical literature. Full though his time is, he should learn before he qualifies to appraise the value of some examples of current work, for later the journals will be an indispensable source of his mental equipment. These ideals, it will be seen, make a heavy demand on the time as well as on the conscience of the clinical teacher, and since hospital staffs are not elected primarily for the purpose of teaching students, it is well that their work should be supplemented, as it is in some hospitals, by the full-time units, charged with teaching as their prime responsibility. It is they who should set a standard. These, it seems to us, are some of the directions in which the intellectual atmosphere and attitude surrounding the new generation of doctors might be so modified that, given some reform of the curriculum, they may learn to distinguish the dead hand of outworn authority in medicine from the living body of truth, and be ready to play their part, eminent or humble, in welcoming new ideas, or conceiving them, or building them into the fabric of medical theory and practice.

FEVER THERAPY IN NEUROSYPHILIS

THE value of malaria in the treatment of general paralysis or paresis is now accepted, but there is still some doubt whether the benefit is due to the fever alone or to the fever in association with some element in the infective process. It is clear from the good results obtained with machine-produced fever and the interest this type of treatment is evoking, that the problem must soon be solved, and it will be interesting to hear what opinions are expressed by Prof. BESSEMANS and other speakers at the meeting of the Medical Society for the Study of Venereal Diseases this Friday evening.

O'LEARY,[1] of the Mayo Clinic, writing on the treatment of general paresis, says that machine fever gave remissions in 27 per cent. of cases, compared with 35 per cent. with malaria. Whether increasing experience and skill with the mechanical method will equalise the proportion of successes is not yet apparent, but there is reason to believe that machine fever is more easily controlled and therefore safer, which might sometimes compensate for therapeutic inferiority. With either method, the earlier it is applied the better the prospects. In incipient paretics—that is to say, those in whom the condition is diagnosed before the stage of conspicuous mental deterioration—the remission-rate with fever therapy is as high as 50–85 per cent. O'LEARY concurs in the growing opinion that fever therapy is as necessary in other forms of neurosyphilis as it is in general paresis. In asymptomatic neurosyphilis he recommends routine courses of arsphenamine and bismuth injections; these may be expected to reverse the cerebro-spinal fluid findings in 85 per cent. of patients with "weakly positive" spinal fluids, but in only 45 per cent. when the spinal fluid changes are "malignant"—i.e., characteristic of G.P.I. When reversal cannot be secured, and especially when the paretic characteristics are present, more intensive measures are recommended, including intraspinal therapy, trypars-amide, and artificial fever. Spinal-fluid changes that have proved irreversible by chemotherapy have become negative with malaria in 25 per cent. of cases. In the meningeal types of neurosyphilis the results with fever are very favourable, but the vascular types are more resistant. O'LEARY found the value of different forms of treatment in tabes dorsalis difficult to assess, since in resistant cases many had been used; but malaria arrested the progress of the disease in about a quarter of the cases in which chemical therapy had proved ineffective.

It is of course not very easy to insist on fever treatment for patients who are symptomless or whose symptoms are slight. Malaria and fever induced by physical methods are neither of them by any means free from danger. The former usually demands a long stay in hospital and the latter requires expensive apparatus and teams of trained workers. Hence it is not surprising that attempts have been made to find less severe forms of pyrexial therapy which are applicable to out-patients, cause no severe constitutional disturbances, and are effective in the resistant forms of neurosyphilis. Typhoid vaccine given intravenously has been used for some time in the treatment of neurosyphilis and other conditions, but has the disadvantage of causing much constitutional disturbance with only a brief rise of temperature. Hoping to get over these objections KULCHAR and ANDERSON[2] have employed the flagellar (H) fraction of typhoid antigen, prepared according to the method suggested by M. T. SCHNITKER in 1934, in the treatment of 38 patients with neurosyphilis (including 6 with clinical and serological evidence of paresis), all but 2 of whom had failed to respond to ordinary methods. After a preliminary dose of moderate size to test the individual reactions, two doses were given each day; the first was sufficient to stimulate a response and the second, slightly smaller, was injected as soon as the temperature began to rise. By this divided dosage the temperature was brought to a higher level and was sustained longer than is usual. Treatment was given daily for 10–18 days with a rest every seventh day and progressive increase of

[1] O'Leary, P. A., *Proc. Mayo Clin.* 1937, 12, 712.

[2] Kulchar, G. V., and Anderson, L. E., *Amer. J. Syph. Gon. ven. Dis.* 1937, 21, 418.

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dosage was usually needed. By this means temperatures of 104°–106° F. were induced and maintained for 1–1½ hours. Most of the patients with symptoms experienced some relief and 2 of the 6 paretics had satisfactory remissions, while 3 others showed some betterment in mental condition. In 14 patients with positive tests in the cerebro-spinal fluid it was possible to make a comparison of the tests before and after the fever therapy. In 4 whose changes were of paretic type, the reversal to negative was almost complete, and in 8 others the spinal fluid tests showed substantial improvement. It will be seen that these figures, as far as they go, compare favourably with those reported from fever attained in other ways. The advantages claimed are that reactions are relatively slight, that the treatment is easily controlled, that the patients are ambulant between their bouts of fever, and that with nursing supervision the injections can be carried out in the patient's home. If further work along these lines gives equally good results pyrexial treatment may become applicable to a number of patients who, through lack of facilities or through feebleness, would otherwise be denied this useful aid against resistant neurosyphilis.

EPILEPSY AND ELECTRIC DISCHARGES

AFTER an infancy as "the Berger rhythm" in the publications of academic physiology, and an adolescence as "brain waves" in the lay press, electro-encephalography is settling down to a useful maturity applied to the study of nervous diseases. In a paper just published in *Brain* GIBBS, GIBBS, and LENNOX of Boston maintain that their observations on electrical discharges from the brains of epileptic patients demonstrate "the pathological physiology of epilepsy to be a paroxysmal cerebral dysrhythmia."[1] This confident conclusion reflects the tone of their whole paper and brings it into contrast with that of GOLLA, GRAHAM, and WALTER[2] in which a more cautious attitude is expressed in the admission that "at the present stage no definite pronouncement is possible as to the significance of the delta-wave foci in epilepsy." This difference of opinion is the more interesting because there is no apparent disagreement in the observations of the two groups. Since electro-encephalography is already taking an important place in the diagnosis of epilepsy in this country, it is important to be quite clear as to what may be accepted and what must still be considered speculative in this recent work. The technique, which is analogous to electrocardiography, is much the same in all laboratories. It involves the amplification by thermionic valves of the very small bio-electric potentials of the brain as led off from electrodes on the scalp, and their registration by some sort of oscillograph. If the source of the electrical changes is to be localised at all exactly, several amplifying-recording systems must be used simultaneously, and this considerably increases the complexity and cost of the apparatus, one type of which has been described by WALTER[3] in a paper on the location of cerebral tumours by this means. Being derived from orthodox and well-tried principles the technique may be considered reliable in experienced hands.

The electro-encephalographic inquiry into epilepsy follows two main paths. In Boston LENNOX, F. A. and E. L. GIBBS, DAVIS, and others have approached the problem of the electrical discharges associated with the epileptic seizures themselves and have not been much concerned with the precise location of the discharge except that they sometimes state that it was "frontal" or "occipital." In London GOLLA, GRAHAM, and WALTER have studied the much smaller abnormal discharges found in the majority of certain classes of epileptics in the period between seizures, and have concentrated on the location of these discharges as exactly as possible. The data accumulated by the Boston group may be summarised as follows:—

(1) The great majority of epileptic seizures, in fact *all* true epileptic fits, are accompanied by large rhythmic electrical changes.
(2) The *form* of these changes is distinctive for the three main types of fit—major, minor, and epileptic equivalent.
(3) Very slight minor attacks can be detected in some patients by electro-encephalography when they are imperceptible by other means.
(4) A major fit may be predicted some hours in advance when an increase is observed in the resting abnormal discharge.
(5) The abnormal activity sometimes appears to start in one area of the cortex and spread to others. "One patient with abnormal spikes confined to the frontal area has greatly improved following bilateral amputation of his frontal lobes."

These facts, obtained from the study of about 400 patients, may be taken as trustworthy; moreover they have been confirmed by other observers. The second group supply the following information:—

(1) Abnormal electro-encephalograms are found *between fits* in about half the "patients complaining of fits."
(2) The abnormality in most cases does not closely resemble the type of discharge found during fits, but is similar to the slow waves previously found near cerebral tumours and called delta waves.
(3) The clinical diagnosis in the majority of epileptics showing a delta-discharge has been idiopathic epilepsy. Patients whose fits are symptomatic or hysterical give normal records. Whatever the diagnosis, abnormal records are unusual in patients over the age of 40.
(4) In most cases the discharge is focal, and, although the correlation is not perfect, patients with mostly major fits have a precentral focus, those with mostly minor fits a post-central one. The commonest site for the precentral foci is in the neighbourhood of the superior frontal gyrus on either or both sides; for the post-central foci the region of the supramarginal gyrus is common.
(5) When a patient with an abnormal focus has a fit during the examination, the discharge characteristic of the fit is seen first in the region of the focus and spreads from there to other parts of the cortex.

[1] Gibbs, F. A., Gibbs, E. L., and Lennox, W. G., *Brain*, December, 1937, p. 377.
[2] Golla, F., Graham, S., and Walter, W. G., *J. ment. Sci.* 1937, 83, 137.
[3] Walter, W. G., *Proc. R. Soc. Med.* 1937, 30, 579.

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(6) Although the size of the focal discharge does not follow changes in the treatment of the patient—e.g., by giving or withholding phenobarbitone—"spontaneous" changes in the frequency of fits are associated with corresponding waxing and waning of the resting focus.

These findings may be accepted with the same assurance as those of the first group. They were obtained from the observation of a similar number of patients.

A consideration of these undoubted facts already enables us to assess the clinical value of electro-encephalography in a provisional way. It is clear that the *diagnosis* of epilepsy may be greatly simplified. In the first place, if a fit can be observed one can tell whether it is "genuine" or not, and in the second place, if a delta focus is found it is strongly suggestive of idiopathic epilepsy provided the possibility of cerebral tumour or abscess has been ruled out. At any rate a positive finding will exclude hystero-epilepsy and malingering, though a negative one is not conclusive, and electro-encephalography has now been used successfully for diagnostic purposes at the Hospital for Nervous Diseases, Maida Vale, for more than a year. Disappointingly little, however, has been learned about the *ætiology* of the disease. Although a fit may be predicted, the reason for its genesis remains obscure, and the resting delta foci found in most young idiopathic epileptics have not been satisfactorily explained. There is indeed no inductive proof that the electrical discharges are more than adventitious signs of some more subtle cortical or subcortical condition, and if too many assumptions are made about the electro-physiology of the hemispheres, the new methods will probably produce more red herrings than facts. So far *treatment* too has benefited little. It is notoriously difficult to assess the value of surgery in epilepsy; an epileptic patient is often "greatly improved" after an apparently irrelevant operation, and even after hæmorrhage alone. The results of WILDER PENFIELD[4] in cases where there was every indication for surgery have not been more than moderately good, and few patients will submit to bilateral amputation of the frontal lobes except to avert a catastrophe. In an oral communication to the meeting of the League against Epilepsy last October, WALTER mentioned a case with a well-defined delta focus in which a craniotomy was done by Mr. WYLIE MCKISSOCK, the focus being verified by direct leading-off under a local anæsthetic and successfully removed in two stages. We understand that the results of this operation have been so baffling that it has not yet been possible to present them for publication. None can doubt however that the exact location of the abnormal area is essential as a prelude to experimental surgery, both for the sake of the patient and to reduce the number of variables. Furthermore, when it comes to the *classification* of the epilepsies there is hope that electro-encephalography will help to provide a basis for the objective rearrangement of the few facts we possess.

ANNOTATIONS

ADOLF LOEWY

THE recent death of Prof. Loewy at the age of 70 in Davos will recall his long association with Prof. Nathan Zuntz in Berlin. Trained in this school it is not surprising that his own interest and his personal researches were centred in the study of the physiology of the respiration in the widest sense. At the beginning of his career he took part with Zuntz in those investigations of the alkalinity of the blood which in more recent years have proved of profound importance from the point of view both of the transport of carbon dioxide in the blood and of the general theory of the regulation of the reaction of the blood. The measurement of the respiratory exchange soon attracted his attention, and in studying the influence of alteration of the composition of the inspired air he showed in 1895 that the oxygen consumption of man was practically uninfluenced by a considerable increase or reduction of the oxygen concentration in the air breathed, and from this he passed on to an investigation of the "dead space" of the pulmonary system and the bearing of this on the composition of the air in the alveoli of the lungs. It was no doubt his investigation of the influence of low atmospheric oxygen concentrations that awakened his interest in the physiology of man at high altitudes, an interest that remained unabated throughout his life, and led to the publication in collaboration with Zuntz, Müller, and Caspari of the well-known volume "Höhenklima und Bergwanderungen" (1906), the result of an expedition to the summit of Monte Rosa, as well as to his later monographs "Physiologie des Höhenklimas" (1932), and, in association with E. Wittkower, "Pathology of High Altitude Climate" which appeared in 1937, only a few months before his death. In addition Loewy published numerous papers on the influence on the respiratory exchange of changes of external temperature and variations of climate as well as on other problems connected with general metabolism. We recall an investigation made in collaboration with H. R. v. Schrötter in 1905—an attempt to measure the output of the heart in man by an indirect method. The results of this investigation were, it is true, uncertain; the fault lay however not so much in the difficulty of the technique as in the imperfection of existing knowledge regarding the factors governing the absorption of gases by the blood and the composition of the air in the lungs. None the less we must regard this as a pioneer experiment in an exceptionally difficult field; many years of physiological work were to intervene before a successful adaptation of the method on which their research was based was rendered possible. Loewy also contributed important articles on the blood gases and on the respiratory exchange to Oppenheimer's "Handbuch der Biochemie," and was associated with Zuntz in editing the "Lehrbuch der Physiologie des Menschen" which was first published in 1909 and ran through several editions. For the ten years 1923–33 Loewy was director of the Swiss Research Institute for Alpine Climate and Tuberculosis, and when he retired four years ago he continued to live in Davos.

[4] Penfield, W., *Arch. Neurol. Psychiat., Chicago*, 1936, **36**, 449.

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A NEW METHOD OF ARTIFICIAL RESPIRATION

IN this industrial age it is essential that all who may have to render first aid should be fully aware of the vital importance of immediately giving artificial respiration when life is endangered by accidental suffocation, shock, or poisoning. In a pertinent criticism [1] of the methods usually employed Prof. Stefan Jellinek, of Vienna, advocates in their place another simple manœuvre. The subject lies supine with a rolled up coat or other improvised bolster behind the shoulder blades. Then the operator, kneeling at the back of the head, presses the shoulders down till they touch the ground for two seconds. Thus inspiration is brought about by enlarging the thoracic cage, expiration following when the pressure is released. To keep a clear airway the patient's index and middle finger of one hand are put into his mouth on the tongue and pushed back, the wrist being attached to the neck by a handkerchief or other improvised cord. In this way the tongue is prevented from falling back and obstructing the larynx, an obstacle to success that is often insufficiently anticipated by the inexperienced. Jellinek asserts that on anatomical and physiological grounds the thorax should never be subjected to compression; the only proper way to bring about respiration is to increase its expansion. There seem, however, to be certain limitations to this doctrine in practice. When suspended respiration is due to the inhaled contents of the lungs, as in drowning or during anæsthesia, the first efforts should surely be to expel these. It seems to be the logical method in these instances to start with compression, however damaging theoretically it may be in ordinary circumstances.

BLOOD VOLUME AFTER OPERATIONS

THE effect of surgical operations on the blood volume has been studied by Gibson and Branch,[2] who have used a dye method to measure the plasma volume and have calculated the cell and total volumes from this and the hæmatocrit reading. They found that during anæsthesia there was an early rise in plasma volume, but subsequent reduction or increase depended on a rise or fall of blood pressure respectively. Abdominal operations were also accompanied by variations in the plasma volume dependent on changes in blood pressure. At the end of the operation the total volume was diminished, but the diminution was to some extent counteracted by an "influx of red cells into the circulation." Thus in one instance an increase of 330 c.cm. of red cells was registered. Two patients who had each received a litre of normal saline solution intravenously showed an increase in plasma volume but a decrease in cell and total blood volume. None of the patients were noted to have developed surgical shock.

The findings are open to the criticism that their accuracy depends on the constant behaviour of the dye in the circulation under all conditions. It is hard to believe that in one case cited an *increase* of cells of no less than 330 c.cm. should more than cover a decrease of plasma volume of 290 c.cm. Whence could such a large volume of cells come in such a short time? It seems more likely that the plasma loss was much greater, but was masked by the simultaneous disappearance of the dye from the circulation, possibly into the tissue spaces along with the plasma, and that the increase in cell volume was purely relative, the total blood volume being decreased. There seems no doubt that for the accurate investigation of blood-volume changes in conditions where shock may occur, it is necessary to use direct methods for the simultaneous and separate estimation of the cell and plasma volume.

RICKETS AND OSTEOMALACIA IN CATTLE

PREVIOUS experiments in South Africa on the metabolism of calcium and phosphorus in cattle have led workers there to attach little importance to explanations of rickets and osteomalacia based on the ratio of calcium to phosphorus in the diet (or the modified *Erdalkali-alkalizität* of the German investigators). The question of the Ca : P ratio has now received close attention, and metabolism experiments on young cattle have shown [1] the influence of diets containing a sufficiency or deficiency of phosphorus, together with varying amounts of calcium. Rickets or osteomalacia was produced only where the phosphorus intake fell below normal, and was never produced when the calcium intake was below normal unless the phosphorus was also low. It is evident therefore that the Ca : P ratio plays no essential part in causing rickets in cattle under the conditions of this particular experiment; but it certainly influences the subsequent course of the disease. Phosphorus deficiency in cattle is well known to depress the appetite, which makes for poor growth. The present experiments demonstrate that the loss of appetite is greatest when there is excess of calcium and least when the ration is deficient in calcium as well as phosphorus. It follows therefore that rickets will advance rapidly with a diet deficient in both phosphorus and calcium, because there is little disturbance of appetite and growth in consequence proceeds at almost the normal rate, though there is not enough mineral to build up the bones. If, on the other hand, the diet contains a deficiency of phosphorus and an excess of calcium, the appetite is poor, growth is much retarded, and the rickets consequently makes slow progress.

CURE OF GONORRHŒA IN THE FEMALE

THE diagnosis of gonorrhœa in the female is beset with difficulties, and it is often impossible to find gonococci in women who are believed to have transmitted the infection. The corollary is that it is very hard to say that a patient has been definitely cured, and some go so far as to believe that gonorrhœa in the female is an ineradicable disease. A statement by the surgeon-general of the United States public health service, that "we have no sure means of rendering such cases non-infectious," has impelled Dr. Wharton,[2] of the Johns Hopkins Hospital, to review his own results and suggest criteria of cure. He describes his experiences with 76 cases (21 children and 55 adults) treated in private practice during the past ten years. Of the 21 children with vulvo-vaginitis 18 completed the course and were passed as cured after periods averaging 22 months from the cessation of treatment. One of them married twelve years later without transmitting infection and has borne a healthy child. Wharton's standards of cure in these cases include observation with negative clinical findings over at least a year, with a minimum of six negative smears taken at monthly intervals and confirmed where possible by cultures. The 55 adults

[1] *Pr. méd.* Jan. 5th, 1938, p. 32.
[2] Gibson, J. G., and Branch, C. D., *Surg. Gynec. Obstet.* December, 1937, p. 741.

[1] Theiler, A., Du Toit, P. J., and Malan, A. I., *Onderstepoort J.* 1937, 8, 375.
[2] Wharton, L. R., *Amer. J. Syph. Gon. ven. Dis.* 1937, 21, 593.

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were divided into 33 who were treated by local applications alone and 22 in whom these were supplemented by various operations, such as removal of infected Fallopian tubes, excision of Bartholin's glands, and cautery or excision of urethral or cervical glands. In the former group only 1 certain cure is claimed, in the case of a patient who was followed for a year with repeatedly negative findings, and later married and became pregnant without transferring infection to her husband. Wharton states that "the results of incomplete treatment are evident in this group. Marital infections, arthritis and invalidism are common." The number of these patients discharged as cured and the tests applied are not stated, but either the patients failed in coöperation or the tests were inadequate. Of the 22 in whom foci of infection were treated radically, 17 were traced and submitted to further examination and tests. In all but 2 the clinical examination and tests were negative; 1 patient has become pregnant since she was discharged as non-infectious, and her husband has remained uninfected.

From this experience Wharton recommends that criteria of cure should be based on careful observation through the stages of the disease with radical excision of infected foci after localisation; on repeated follow-up examination and testing for a year; and on the absence of recurrence or marital transference of infection. This last test of course can only be used by the clinician in retrospect—as a measure of the accuracy of past decisions—and as such it would certainly provide convincing evidence. Information of this kind is, however, difficult to obtain and the examples recorded in Wharton's paper are insufficient to justify his conclusion that "gonorrhœa in women can be cured and that we have reliable criteria of cure." In fact this retrospective assessment shows only too well the pitfalls that even the most careful clinician may not avoid in deciding that gonorrhœa in the female is cured.

INTESTINAL KNOTS

THE curious fact about knotting of the intestine is that some three-quarters of the reported cases come from Finland, where writings on the subject date back to 1906. Faltin [1] has critically examined the material collected by previous authors and has classified the types of knot. Those involving a single loop of intestine, though theoretically possible, are probably excessively rare: the solitary case report found by Faltin failed to convince him. Much the commonest is the knot between a loop of small intestine and a loop of the pelvic colon; 133 were reported by Kallio [2] in this situation, as against 26 elsewhere. The cæcum and small intestine were involved only twice, and Faltin shows by description and illustration that this is likely to be a complication of the long bag-like cæcum. Only once did the knot involve two parts of the large bowel, but in 21 it was between two coils of small intestine, and of these 21 not more than 6 were described outside Finland. The knots between the small intestine and the pelvic colon are alone of much practical importance, and Faltin shows that they must of necessity fall into two main groups, and that recognition of this fact is the first step to their successful resolution at operation. In twisting itself round the pelvic flexure the coil of small intestine passes either above (cephalad) or below (caudad) the root of the pelvic mesentery, and the twist is to the right in the former and to the left in the latter. Faltin recommends holding the loop of pelvic colon out of the wound vertically in the sagittal plane. The direction in which the two loops of bowel cross one another is then determined before an attempt is made to untie them. The operator can untwist the coils by supinating the right hand, if it is a twist to the right, and by pronating, when the twist is to the left. Sometimes, particularly near the ileocæcal junction, one coil of intestine may pass through behind the mesentery of the small intestine, tying the knot even tighter. Obstruction of one or other coil may be complete. The condition of intestinal knotting is now so well recognised in Finland that five cases are on record in which a pre-operative diagnosis was made of a knot between the pelvic colon and the small intestine. Faltin thinks that tenesmus associated with abdominal pain may prove to be a useful diagnostic sign. Blood in the fluid return from an enema, or the passage of blood-stained mucus have also been noted. The meteorism and the severity of onset, characteristic of volvulus of the sigmoid, should serve to eliminate that diagnosis.

[1] Faltin, R., *Acta chir. scand.* 1937, 80, 1.
[2] Kallio, K. E., *Acta chir. scand.* 1932, 70, Suppl. 21.

LIESEGANG RINGS IN THE BLOOD

Dr. Rudolf Bucher, director of the laboratory of the surgical clinic at Basle University, has long been studying the formation of Liesegang rings in the plasma-gel obtained by addition of a calcium salt to citrated blood plasma, and has now devised a new system of blood investigation based on this reaction.[1] Briefly, the method consists in the addition of potassium dichromate to the plasma, and after clotting has occurred, pouring on to the surface a solution of silver nitrate. The precipitation of silver chromate, in the presence of a colloid (plasma-gel), occurs in definite zones or bands, separated from each other by regions free from any precipitate; the discoverer of these rings, Prof. Liesegang, contributes a preface to this book. Dr. Bucher has conducted very elaborate measurements of the time of appearance and distance apart of these rings in blood of many species of animals and in human blood from subjects of various ages. The results do not permit of brief summary, but as would be expected there is a relationship between this diffusion phenomenon and the protein content of the plasma. Some chapters of the book are devoted to the post-operative blood and the changes in narcosis, and a figure illustrates the reaction in carcinoma, but the changes seen are not specific for cancer. Dr. Bucher intends now to proceed with an investigation of the Liesegang rings in the blood of a variety of pathological conditions.

INSTITUTIONAL TREATMENT OF RHEUMATISM IN SWEDEN

So much doubt is expressed about the ætiology and treatment of the rheumatic diseases that it needs courage and vision to plan a system of institutional treatment likely to give satisfaction several years hence. It has been calculated that the present provision of about 500 hospital beds for chronic rheumatism in Sweden is so far inadequate that another 1300 will have to be provided; and even so, a supplementary scheme of polyclinics will be necessary. With regard to hospital beds it has been a moot point whether they should form independent units or be incorporated in already existing hospital units under the medical control of physicians not specialising exclusively in the rheumatic diseases.

[1] Bucher, R., *Helv. med. Acta*, 1937, 4, suppl. II.

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The compromise which may ultimately be agreed on hinges on numbers; in a hospital with 40–60 medical beds, and as many rheumatic beds, the total not exceeding 120, the best arrangement might be for one physician to be in charge of the lot, with two to three assistant physicians, one of whom has special knowledge or at least special experience of the rheumatic diseases. But when there are more than 90 medical beds and more than 60 rheumatic beds the latter should be in charge of an independent physician who should also have at least 20 of the medical beds at his disposal. It has also been proposed that the hospitality of a certain number of ordinary medical beds should be enjoyed by rheumatic patients so that the general physicians in charge of these beds may continue to have an opportunity "to sharpen their wits on the problem of polyarthritis." It has been suggested that the polyclinic treatment to be provided should be combined with occupations to fill in time, and presumably to effect administrative economies and avoid the demoralisation of unemployment during treatment. This polyclinic scheme has not, however, been met with general approval, the fear being expressed in certain quarters that the treatment provided would prove much less satisfactory than under in-patient conditions. Although there is a strong feeling in favour of speeding-up the building programmes, it is not likely that they will be completed much under 8–10 years. The whole subject was discussed at a meeting of the Swedish Medical Society reported in *Svenska Läkaresällskapets Förhandlingar* for Nov. 30th, 1937 (p. 428).

PROGNOSIS IN EPIDEMIC ENCEPHALITIS

IT is now twenty years since von Economo described an outbreak of what he called lethargic encephalitis in central Europe. For the next decade wave after wave of infection appeared, especially in the first quarter of the year, in almost every part of the world, but since then the number of recognisable acute cases in every country has gradually dwindled, and although sporadic cases occur, epidemic outbreaks of the Economo type seem almost to have disappeared. Investigations into the causative agent, modes of spread and treatment of the acute disease are therefore in abeyance, but unfortunately the epidemic waves have left a vast amount of mental and bodily wreckage behind them, and it is necessary not only to relieve suffering but also to follow its progress. We do not yet know the full history of the chronic phases of the disease and reliable information is still needed and valuable.

Dr. W. J. Holt, in analysing[1] 266 cases admitted to Boston Psychopathic Hospital, records the frequency of the various symptoms, and gives the fatality-rate and the proportion of recoveries, complete or partial, together with his conclusions. Follow-ups of this kind are arduous and tedious, and Holt and his co-workers are to be congratulated on carrying this one out so thoroughly; the condition of 240 of the 266 patients was accounted for, and actually 100 were seen personally. The 240 had not all been admitted to hospital at the same period of their illness; some were in the acute stage, others had lately been through it, and the remainder were in a later chronic stage. The Boston Psychopathic Hospital is not a general hospital, but limits its admissions to persons in whom mental symptoms are conspicuous. This must be borne in mind in considering the results, for by no means all cases in the acute stage come into this category and the same is true of the chronic cases. Accepting this proviso, however, the results are significant. At the end of 1936 it was found that 94 out of the 240 patients had died (39 per cent.) whilst 17 (7 per cent.) had recovered, and 9 of these 17, or more than half, had been admitted in the acute stage. It is of psychological interest to note that in 13 cases complete recovery was claimed by the patient or the friends which on personal examination was found to be unsubstantiated. Besides the 17 who had actually recovered a further group of 46 (19 per cent.) were able to do light work.

As Holt remarks, criteria for recovery vary widely, making comparisons difficult and often misleading. Nevertheless one or two points stand out fairly clearly. In the presence of Parkinsonism the proportion of complete recoveries is almost nil: in the present list the percentage is given, in adults, as 1, in children as 0. Prognosis for complete recovery is very poor for adults with sequelae, but is distinctly better for children. This better prognosis in children seems to be due to the high incidence among them of behaviour disorders, a syndrome all but unknown when maturity has been reached before the onset of the disease. Holt believes that "special training schools for patients with post encephalitic behaviour problems are of distinct value to the community, though with the passage of time children improve with even the ordinary present facilities," and he concludes that "children with behaviour disorders constitute the only group with sequelæ of epidemic encephalitis in whom improvement may reasonably be expected."

[1] Holt, W. J., Jr. *Arch. Neurol. Psychiat., Chicago*, 1937, 38, 1135.

NOT VARICOSE ECZEMA

VARICOSE eczema or dermatitis is a species all too common in the out-patient flora. Few dermatologists spend more than a minute or two in making the diagnosis, and the proportion of such cases continuing to attend for long periods is undeniably large. Favre,[1] who has studied examples of the disease for the last ten years, comes to the conclusion that its title is a misnomer. In the first place the lesions are not eczematous in the true sense of that much abused term, for the typical vesicles are lacking. On the other hand, the primary feature of varicose dermatitis — polychrome pigmentation (yellowish brown to mauve or lilac), resulting from recent or long-standing intra-epidermal hæmorrhages—is conspicuous by its absence in cases of true eczematous eruption. Favre has satisfied himself that the condition is essentially an inflammation of the smaller blood-vessels leading to their local multiplication. Their walls are very thin and fragile, and diapedesis of corpuscular elements is the rule. Such vascular disorganisation cannot continue long without some secondary epidermal reaction, and the clinical evidence of this, according to Favre, is a parakeratosis superficially resembling psoriasis, but never the papular or vesicular lesions that are the hallmark of eczema. The parakeratosis may become secondarily infected with the common skin organisms, and being pruriginous is always rubbed or scratched so that abrasions and even ulceration often follow. For varicose eczema, then, Favre would substitute the term "angiodermite purpurique et pigmentée." His short paper has nothing to say about the underlying causes. His purpose is merely to draw our conscious attention to this group of dermatoses and ask for more discrimination in approaching them. Like all skin

[1] Favre, M., *J. Méd. Lyon*, 1937, 18, 289.

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ailments that owe their origin to vascular damage, they are, he admits, exceedingly refractory to treatment.

HORMONES IN OVARIAN CYSTS

IN the uterine disorder known as metropathia hæmorrhagica a hypertrophied mucous membrane and absence of true menstruation are associated with the presence of follicular cysts of the ovary. These cysts are held responsible for the condition of the uterus, and it has been found that they contain œstrin. In our present issue Miss Lepper and her colleagues show that the concentration of œstrin in the fluid is of the same order as in the normal ripe follicle, and since the cysts are larger than the follicles the total amount of œstrin in the ovary is greater than usual. Of the other forms of ovarian cyst that they examined, only 2 (germinal cysts) yielded œstrin, and it is thought that this was derived from the blood stream. It is not surprising therefore that they should also find that menstrual irregularities, and also pain and swelling in the breasts, are relatively often associated with this particular ovarian disorder. Adair and Watts[1] in Chicago, who have made a somewhat similar study of ovarian cyst fluids, agree that the follicular cysts contain the highest concentration of œstrin, but were unable to correlate their findings with the menstrual cycles of their patients. Their paper, which includes a useful review of data published by other observers, records the œstrin content of 229 cysts obtained from 158 cases of ovarian tumour of various types, and the gonadotropic hormone content of 21. The test for œstrin was made by injecting cyst fluid (concentrated or unconcentrated) into adult castrated rats and it was found that the average amount of hormone per cubic centimetre was characteristic of the type of cyst. Those in which ovarian tissue was not incorporated did not contain any œstrin at all unless the patient was pregnant. It is interesting to note that œstrin was often found in cysts developing after the patient was over 45 years old.

REPORTED INCREASE OF SCABIES IN LONDON

THERE is a general feeling among school and medical officers of health that scabies is on the increase among school-children in the London area. Dr. A. B. Francklyn, himself a medical officer in the school service, records this impression in the recently issued L.C.C. annual report[2] and endeavours to trace the sources of infection and the causes of the presumed increase. Scabies in the child, he suggests, is not always easy to diagnose and this is especially true if the examiner limits his investigation to the webs of the fingers. As often as not these have escaped, while typical acarine runs, which are almost as pathognomonic as the acarus itself, will be found about the ankles in young children, occasionally on the soles, and quite often on the prepuce in males of any age. Partial treatment by the mother with sulphur ointment sometimes eradicates this evidence, but secondary sepsis rarely does so. A careful search with a lens will usually confirm a suspicion evoked by the characteristic localisation of scratch marks, severe itching at night, and the presence of other cases in the patient's family. Even in the absence of burrows this triad would be held in most dermatological clinics to justify specific therapy. The acarus is a nocturnal parasite, which is why itching does not give trouble in the daytime unless the skin has been over-treated by sulphur and a dermatitis due to these applications has been provoked. Dr. Francklyn, on testing the hypothesis that the disease is spread in schools, admits that the evidence is usually weak; and this fits in with the view that the infection is conveyed at night, because the female of the species does not emerge and eggs are not hatched until the victim is warm in bed. Some increase of scabies was, we believe, noticed in London hospital out-patient departments during 1936–37, and Dr. Francklyn will find support for his suspicion that immigration from poor districts in South Wales, southern Ireland, and the north of England was partly responsible. An interesting corollary would have been a coincident increase of pediculosis capitis, but this does not seem to have been reported in L.C.C. records, as assuredly it would have been if noticed. Since several of the larger dermatological clinics in London do not appear to have observed the increase of scabies that Dr. Francklyn reports, the probability seems to be that the total is not very great and that it is local in incidence.

[1] Adair, F. L., and Watts, R. M., *Amer. J. Obstet. Gynec.* November, 1937, p. 799.
[2] Report for 1936, Vol. IV, Part III, p. 122. London: P. S. King and Son. No. 3320. 5s.

EXCLUSION OF "NATURE" FROM GERMANY

THE Ministry of Education of the German Reich has decided that the English scientific weekly journal *Nature* must henceforth be excluded from general use in scientific libraries because it has contained attacks on German science and the National Socialist State. Arrangements can still be made for the secret use of the journal, with restricted access. In commenting on this decision our contemporary says that it welcomes the opportunity of recording worthy additions to the literature of science or to natural knowledge from any country or race; "but we should be false to the traditions of science if we failed to condemn any influence which would make scientific research subservient to political or theological domination."

THE King and Queen have agreed to visit Birmingham in July, when the King will open the new Hospitals Centre at Edgbaston.

WE regret to learn of the death of Sir THOMAS STANTON, chief medical adviser to the Colonial Office, on Tuesday last at the age of 62.

WE have also to record the death after a short illness of Mr. HENRY DICKINSON, official shorthand writer to the Royal Society of Medicine and many other medical societies, as well as to the Royal Institute of British Architects. Recently he had been appointed executive secretary of the Medical Officers of Schools Association. He was a careful and conscientious reporter, and many of those who contributed to medical discussions owe him more than they know for setting out in brief compass what they had intended to say. His little book on medical reporting in Pitman's shorthand went through several editions, and made things easier for those who followed him. All will join with us in a tribute to the memory of a man with a high standard of public service.

THE LANCET 100 YEARS AGO

January 27th, 1838, *p.* 648.

A reply to a correspondent.

Wix. Spears should be light in the head. However, it is better to fill tin boxes with treaties of peace than the implements of diabolical war.

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SPECIAL ARTICLES

THE DEAD HAND IN MEDICAL SCIENCE*

By Sir Walter Langdon-Brown, M.D., F.R.C.P.

EMERITUS PROFESSOR OF PHYSIC IN THE UNIVERSITY OF CAMBRIDGE; CONSULTING PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL

It is recorded of a professor at Padua at the time of the Renaissance that he began his inaugural lecture by ceremoniously and symbolically burning the works of Galen. The age of authority had ended, the era of observation and experiment had begun. Great as Galen's services to medicine may have been in the past his authority had acquired such force that it stifled all curiosity, and "without curiosity there can be no science." The greater the authority, the subtler is this danger. Yet it is curious that Hippocrates, the father of medicine and the greater man, had much less effect in this respect. I believe this was because the Greeks were always taught to think for themselves, while the Romans were obsessed by the idea of law and order, which gave them a strong bias towards authority. The Church of Rome carried on that conception of authority and for centuries medicine was bound by it. Only the Arabic school kept medical science alive, as exemplified by Maimonides in the eleventh century. Himself a Jew he was educated in the Moorish University of Cordova. The expulsion of the Moors brought Spanish medicine to an end and one can only lament that its recent revival seems like to perish again from internecine strife.

DEAD MEN'S THOUGHTS AND DEAD MEN'S IDEALS

The history of science is sharply contrasted with that of art by the fact that we can build in an orderly manner on the foundations of our predecessors while each new school of art appears to find it necessary to denigrate those who went before and to despise their work. But this very orderliness has a danger of its own; it makes it more difficult to expel error. Each one of us, as Osler said, drags about with him some of the error in which he was originally trained. It is the power of the dead hand. Too much, as Leonard Woolf says, "individuals think dead men's thoughts and pursue dead men's ideals . . . mere ghosts of belief, ideals from which time has sapped all substance and meaning. . . . A dogma is simply a belief which the living receive as a command from the dead." Indeed this influence of the past is almost inevitable since we carry within us, still living, the genes of our dead ancestors. Yet every teacher is brought to realise that this influence is not all-powerful and that his students are helped to a considerable extent by their freedom from preconceived ideas. It has fallen to my lot, as it probably has done to many of you, when demolishing some obsolescent theory, suddenly to realise from the faces of my audience that I am trying to force an open door. They have not had to emancipate themselves—to that extent, though a limited one, they are born free.

It has been well said that a teacher whose disciples do not go beyond him has failed. Judged by that standard alone I could claim not to have failed, for many of my students have gone far beyond me, sometimes further than I can follow! Seriously, it is true that to smother a student beneath the weight of authority is to hamper the progress of medicine.

When that Paduan professor burnt Galen's books he did not kill the authoritarian attitude, which rose again like the phœnix refreshed from the flames. Linacre the founder of English academic medicine and of the College of Physicians was authoritarian at heart, as might be anticipated from his close association with the Church. Indeed, he subsequently became rector of Wigan and was the only inhabitant of that borough to become F.R.C.P. until the election of Dr. W. E. Cooke in 1934. The regius professor of physic at Cambridge merely read and expounded the writings of Hippocrates and Galen, so that it is not surprising that Harvey had to leave Cambridge for Padua, whereby my old university lost its chance of becoming the alma mater of the experimental method. Indeed Harvey himself in his later life came more under the influence of authoritarian thought than he was when he propounded his revolutionary ideas on the circulation. Is that a consolation or a warning to those of us who are seniors?

The latter half of the seventeenth century was a time of real progress in science, which was unfortunately seriously hampered towards its close by the phlogiston theory of Stahl which was maintained by his authority long after his death.

To-day it seems an extraordinary idea that something which was opposed to the force of gravity should be given off during combustion. Yet for nearly a century it prevented recognition of the remarkable researches of John Mayow concerning what we now call oxygen and its rôle in respiration. Again and again it prevented researchers, such as Joseph Priestly in particular, from drawing correct deductions from their accurate experiments. Throughout the eighteenth century progress in the chemical aspects of physiology was barred by the dead hand of Stahl. Yet once his theory lost authority, men wondered how it could have cumbered thought so long. When Lavoisier effected its overthrow, many observations already made fell into their place as at the touch of a magician's wand.

The phlogiston theory merely darkened counsel, but of many theories of the past it would be fair to say as Sir James Frazer has said of certain superstitions that in their day and generation they served a useful purpose. The trouble is they outlive their usefulness.

Thus that great clinician of the seventeenth century, Sydenham, believed that every disease was an entity quite apart from the particular patient who displayed it, and he urged that our first duty is to reduce diseases to certain definite species with the same care that botanists were then using in their description and classification of plants. Even at the beginning of the nineteenth century when the great French school arose, most of their eminent physicians accepted Sydenham's view, though Bichat interpreted it in the light of morbid anatomy. But Broussais vehemently protested against the conception of diseases as actual entities. At best they were metaphysical abstractions; no two cases displaying certain morbid symptoms were ever identical. Meanwhile the art of clinical description was being developed particularly in London and Dublin.

For Bichat it was the tissue not the organ to which we must look for the explanation of disease. Histology pushed the problem further back with the aid of the microscope and the cell became the centre of interest. With the introduction of cellular pathology, humours and diatheses were relegated to the limbo of superstition. Virchow declared that there is no such thing as a sick body that is disordered in all its parts and maintained that no doctor can systematically think

* An address to the North London Medical and Chirurgical Society on Jan. 20th, 1938.

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of a morbid process unless he is able to assign to it a place in the body. The part for him became greater than the whole. But as we shall see humoral pathology and diatheses were to come creeping back, though with new and more scientific attributes.

NECROLOGY *v.* BIOLOGY

The late Dr. F. G. Crookshank used to refer sarcastically to the mortuary and veterinary schools of thought, meaning the methods of morbid anatomy and experimental physiology. It is interesting to note the rise and fall of morbid anatomy. Rokitansky in Vienna said in 1846 "pathological anatomy should be the base not only of the knowledge of physicians, but also of their practice as it contains all there is in medicine of positive knowledge." Great as have been the services of morbid anatomy to medicine no one would make such a claim as that to-day. Its great defect was that it concentrated on end-results, a stage in which the patient is not interested. The strength of its influence was amusingly illustrated when I became demonstrator of morbid anatomy at St. Bartholomew's Hospital. The post-mortem register was still labelled "register of complete cases." There you have it—no medical case complete until the post-mortem table is reached! The mortuary school. That able physician, the late Sir James Goodhart, in 1912 sensed the passing of morbid anatomy, taking that subject for his Harveian oration. He said "whereas we used to display disease in the gross, the results of disease that is, we are now able to recognise finer changes behind these results, and they are the goal that we make for now." A little later on he made a remark which falls strangely on our ears now, "I struck a hybrid the other day—a biochemist"! When I read these words recently, I realised with a shock how swiftly fashions change. Morbid anatomy, experimental physiology, bacteriology, each in their turn have brought great gifts to medicine, but at the moment it is to the biochemist that we are looking, and not in vain, for most help. But of that more anon.

Exactly comparable changes have been occurring in neighbouring sciences. Prof. E. W. MacBride has recently called attention to the fact that Huxley would persist in looking at animals as material structures and not as living active beings; in a word, though he invented the term biology he was a necrologist rather than a biologist, a student of the dissected corpse rather than of the living organism. And his dominating influence emphasised the morphological at the expense of the functional among zoologists for many years. It underlies the tenets of Weissman, that Calvinist among biologists, but is now being rapidly modified by the recognition of the part which function and habit play in moulding structure. Hence the rise of the school of experimental zoology. Just so in medicine the methods of biopsy now made possible by surgery and radiology are profoundly modifying our ideas of anatomy and pathology. There are few more hopeful signs in medical education than the way that the modern-minded anatomist is demonstrating the body in action instead of relying simply on the dissection of a corpse which has been modified, in some respects beyond recognition, by preservatives. Until recently the teaching of anatomy was, as Wilfred Trotter says, that of the pre-anæsthetic days.

SOME CHILLY WELCOMES FOR NEW KNOWLEDGE

Pathological anatomy was, of course, profoundly modified by the discovery of micro-organisms and the rise of *bacteriology*. It would be superfluous to dilate here on the advances thus made possible. Yet we know what opposition the microbic theory of infection encountered. The mental concepts behind such words as influenza and malaria were difficult to overcome. The late Dr. Charles Creighton, the most learned historian of epidemics opposed it stoutly to the end of his life. Rather than yield one iota he preferred to remain obscure and impoverished. Worse still for his memory, he seriously damaged his monumental work by saturating it with his prejudice against bacteriology. We all know the opposition which Lister encountered but perhaps it will surprise you to hear that a well-known surgeon at Bart.'s, who only retired two years before I entered the hospital, was accustomed to the end of his time on the staff to treat his hernia wounds with linseed poultices and on the third day to look at them with satisfaction and say, "Ah, healthy, laudable pus"!

But to-day we can recognise that bacteriology has not brought us all the gifts we anticipated. For it overlooked for a time that the soil was an important factor in infection as well as the seed. There is not only the microbe which invades the individual but there is the reaction of that individual to the microbe to be considered. Although through the domination of cellular pathology, immunity was for a time chiefly thought of in terms of phagocytosis, with Bordet and others came the recognition of the part played by the body fluids in this and allied processes. Humoral pathology was restored to respectability, though with a difference with the growth of serology. Then biochemistry busied itself with the changes in the cell itself, with its changing surface tensions and its internal catalysts; and so cellular pathology in a new form has made the old one seem quite inadequate. But be it noted each of these theories served their day and generation well—each was a step in advance. The drawback was that the authority of each dominated medical thought just too long.

A similar attitude of mind delayed the initial stages of *endocrinology*.

As long ago as 1775 Bordeu wrote, "Every organ serves as a workshop for the preparation of a specific substance which enters into the blood: such substances are useful to the body and are needed in order to maintain its integrity." Here indeed was the germ of the idea of internal secretion which lay dormant for the greater part of a century until Claude Bernard reiterated it in relation to glycogen in 1849. Yet when myxœdema was first recognised in 1873 it was attributed not to the absence of an internal secretion but to the failure of an external excretory process. Considering the bloated appearance of a myxœdematous patient, one can readily understand how that impression arose.

Even when Schiff in 1884 showed the benefits conferred by transplantation of a thyroid into a thyroidectomised animal, the significance of his observation was missed, though he underlined it with the remarkable sentence "it would be interesting to know whether an emulsion of thyroid gland would not have an analogous effect." We may presume that the effects of transplantation might have been interpreted as the replacement of a missing excretory organ, but the failure to follow up Schiff's further suggestion for six years shows how foreign the idea of internal secretion was to scientific thought of the day. Then in 1890 Vessale gave intravenous injections of thyroid extract to thyroidectomised dogs with beneficial results.

The credit for the clinical application of this must be given to G. R. Murray, who had been house physician at University College Hospital and met Horsley then. Murray wrote to Horsley, making the suggestion that myxœdema might be successfully treated by similar injections, but Horsley was not

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at first favourable to the idea. Indeed, he said that the results so far obtained might have been caused by injection from any other tissue. Murray, at a meeting of the Northumberland and Durham Medical Society, showed a patient with myxœdema on whom he proposed to try this treatment. He received a douche of cold water. One senior man present told him he might as well expect an emulsion of spinal cord to cure tabes.

In no way deterred, Murray got the Armstrong College at Newcastle to let him have a small room where he prepared his extracts, going himself to the slaughterers and dissecting out the thyroids of sheep under antiseptic precautions. As we know, his efforts were crowned with success; a year later Hector Mackenzie and others simplified the treatment by giving thyroid by the mouth, thus establishing the result beyond cavil. Later on how slow some of us were to realise how completely another hormone, insulin, had revolutionised the treatment of diabetes, so that young subjects were still deprived of the amount of carbohydrate necessary for their growth and activity.

The recognition of *vitamins* is a more recent story, but here the time-lag between the realisation of an error in dietary in such diseases as scurvy, beri-beri, and rickets and the discovery of the actual cause was a much longer one, particularly in the case of scurvy, where the curative effect of lemon juice had been known since the seventeenth century. The long dispute as to whether rickets was a disease of the dark or of diet was at last resolved in a manner satisfactory to both parties when the influence of ultra-violet rays on the production of vitamin D was demonstrated. This was an interesting example of the way in which two sets of good observations sincerely carried out may, in spite of their apparently discrepant results, both be right but do not contain the whole truth.

The germ theory of disease actually delayed the recognition of the true nature of deficiency diseases, and for a time all that some observers would admit was the possibility that the lack of something in the diet lowered resistance so that microbic infection of low virulence could effect an entry. And now just when the principle of vitamin deficiency seems firmly established, evidence is being adduced that after all there may be an infective factor in beri-beri. In the same way the germ theory diverted research in the wrong direction into a group of diseases subsequently shown by Sir Archibald Garrod to be due to inborn errors of metabolism, transmitted according to Mendel's law.

We may take it to our credit that we readily accepted the evidence that *pernicious anæmia* is not due to hæmolysis but to interference with blood formation. I record it to my shame, however, that when Prof. A. V. Hill wrote from the United States to tell me of the extraordinary results which were just beginning to be obtained from liver treatment, I wrote back, "Wonderful men, these Americans; do they give bacon with their liver?"

There is a well-known saying attributed to William James—"There are three stages in the history of every medical discovery. When it is first announced people say that it is not true. Then a little later when its truth has been borne in on them, so that it can be no longer denied, they say that it is not important. After that if its importance becomes sufficiently obvious they say, anyhow it is not new."

REPRESSION, CREDULITY, AND PRECONCEIVED IDEAS

There is another way in which this reliance on authority does harm. It is one of Freud's main propositions that the repression of a normal outflow of energy results in that energy finding its way to the surface by a devious route and asserting itself in an abnormal or pathological form. Recently I tried to apply this theory to the biology of national life. The trend of evolution is towards internationalism, and this is being strongly repressed by the segregating species-making impulse, in this case represented by a fierce nationalism. The repressed trend is therefore asserting itself in a horizontal line of cleavage, and the conflict of Fascists and Communists becomes intelligible as the pathological or psychoneurotic manifestation of internationalism diverted from its normal course. Just so our neglect or repression of certain aspects of medicine in the past resulted in the appearance of bizarre cults such as homœopathy, osteopathy, and Christian Science.

I should be sorry to give the impression that I considered the effect of this mental attitude of ours to be wholly bad. Indeed, it might well be urged that a greater danger at the present time is uncritical credulity. My distinguished successor at Cambridge, Prof. Ryle, in a lecture recently published dealt very faithfully with that aspect. Admittedly conclusive clinical evidence is hard to come by, since controls are seldom possible, but we are too apt to accept such evidence as is pleasing to our prejudices. That is the basis common to both these prevalent weaknesses—obstinate conservatism on the one hand, credulity on the other. If a new idea can be fitted into the authoritarian framework we are too apt to accept it uncritically, whereas if it breaks new ground we are too likely to reject it. That is where the manufacturing chemist is so clever; he fits his propaganda into the familiar frame, and his representative bludgeons one with a list of distinguished physicians whose enthusiasm for the new remedy literally knows no bounds, according to him. This is called the psychology of salesmanship, and I must admit that the joints in our armour have evidently been carefully studied.

Bacon believed that by the collection of a mass of instances alone scientific theories could be firmly established and that his method would go far to level men's wits. But this left out of account the scientific use of the imagination, which when carefully controlled can see the wood as well as the trees. It is true however that to start research with a preconceived idea is almost fatal, for the mind so attuned will find what it is looking for. The dire results of this method are to be seen in the way a country formerly great in scientific research has prostituted truth to propaganda. "Science knows no frontiers"; "Great is Truth and it will prevail." These two sayings were platitudes to the nineteenth century, but need forcible reiteration to-day when a country expels its leading scientists and adopts a chauvinistic science in an age which has discovered the slogan, "Propaganda is more powerful than truth." Under the pressure of that dead hand not only scientific but all truth must die.

MEDICAL SCHOOLS AS GUARDIANS OF TRUTH

It is all very well to say that the remedy is an open mind combined with critical judgment. How are these attributes to be come by? Surely that wise man Socrates made his greatest error when he said that to do the good it was only necessary to know the good. In that matter St. Paul was nearer the mark. It is easier to recognise the closed or credulous mind in one's neighbour than in oneself. It is easier to point to the errors into which our forerunners fell than to avoid similar ones. If we think we are not falling into errors to-day we deceive ourselves, and

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our successors will not fail to say so. To what extent can we save those successors from falling into error themselves. Every medical school is a guardian for the future of truth. What can be done to help those who come after us to acquire that balanced judgment by which alone such errors can be avoided? Is the present system of medical education entirely free from blame in the matter? I trow not.

In the not very distant past medical education must have been very haphazard according to men who were seniors when I was beginning the study of medicine. But it had one advantage; a man was left very much to his own resources, and to a large extent had to educate himself by his own powers of observation. That is all right for the able man, but ineffective for the weaker ones. In our zeal that all shall come up to a certain standard we have filled them up with so many facts that to-day students have but little time or energy left to cultivate such powers of judgment as they may possess. Therefore I venture to put before you certain views as to the ways in which I think improvements can be effected. It is a matter to which I had recently to devote some attention, for I sat on three committees each and severally designed to improve and lighten the curriculum. I must admit that the results were not impressive. Everyone agreed that the curriculum ought to be lightened, and each thought that some other fellow's subject should be cut down, but that more attention should be given to his own. For my part I was prepared to see quite a lot of cargo jettisoned, as long as room was made for psychology. With that each of the three committees agreed, but I don't see that the curriculum has been materially lightened thereby!

SHOULD DOCTORS BE WELL EDUCATED?

To start at the beginning. Even after ruthless ploughing and plucking are not the aspirants for entrance to our profession in excess of the demands of the public for being doctored on such terms as will provide the doctor with a living? Does this not ipso facto suggest that the threshold should be raised and a more stringent entrance examination imposed? The old ideal of the Church of England was "a gentleman in every parish" and we might advocate that every doctor should be an educated man, and not merely the recipient of a technical training. The roots of specialism go deep—they have pushed their way down into the preparatory schools, which have to be judged by their success in obtaining scholarships at the public schools. The public schools are judged by three criteria, that outlook on life which is symbolised by the old school tie, prowess in games, and the number of scholarships gained at the universities. And even those who are not aspirants for scholarships appear to start on their technical training as soon as they have got their school certificate—i.e., usually at the age of 16. Surely amid the complexity of the modern world general education should not cease then. A generally trained intelligence can easily catch up in the race those who started special training earlier.

Forty to fifty years ago all the preclinical subjects except chemistry and physics were taught by junior physicians and surgeons who were waiting for staff appointments. To-day they are practically all taught by specialists for they have grown too large to be included in the daily work of any practising medical man, however industrious and gifted. The change has undoubtedly led to a higher standard of knowledge in these subjects but it has also tended to produce a divorce between the laboratory and the ward which we must deplore and which many are trying to reconcile. It is also almost inevitable that these teachers should regard their ablest pupils as embryo biologists, physiologists, or pathologists, and so forth rather than prospective healers of the sick. Here I must admit a difficulty; what we want the medical student to know are the principles of chemistry, physics, and biology, but when I discuss this point with, for instance, teachers in biology, they reply that principles are the last thing that the elementary student can grasp and that he must study a considerable number of types before he can appreciate generalisations. I am impressed with the validity of that argument, but am not satisfied that principles are more insisted upon now that a larger number of types are studied than formerly. I believe the same thing applies to chemistry and physics, which provide an excellent mental training and a practice in exact observation, but I should like to feel sure that here too the principles were put in the forefront. It is all to the good, in my opinion, that the amount of mechanics in the 1st M.B. at Cambridge has been drastically reduced. The time occupied in the study of anything more than the most elementary principles of mechanics such as the parallelogram of forces and the properties of levers can then be devoted to electricity, which provides just as much mental training. Also it is more important that a medical student should know something of gamma rays rather than problems concerning elephants sliding down inclined planes.

The plan often adopted is for a boy to matriculate at 16, then do his chemistry, physics, and biology in one year and start his anatomy and physiology. I am one of those who supported the view that the study of anatomy and physiology should not be started before the term in which he attains the age of 18. If he is going to do the preliminary subjects at school he had better take two years over them and continue his general education concurrently. If he is going to do them at college he had better not start then till 17, and continue his general education from 16 to 17. I know there are difficulties in the way, and the tendency will be to go in for an examination as early as possible because of the risk of failure at the first attempt. Parental financial stringency is a spur in the same direction, but I remember that when I told my father that my ambition was to pass every examination at the earliest age permitted by the regulations, he wisely replied, "A very foolish ambition." As a result I did not attempt to qualify until I was a few months over 26, and I have never regretted it.

SALVATION THROUGH DISSECTION

Coming to the intermediate subjects, the chief stumbling-block is anatomy. Here I know I touch on very controversial ground. Anatomists are steadfast, unmovable, always abounding in the faith that dissection of the whole body is necessary unto salvation. Many non-anatomists don't think so, and looking back on my own experiences I believe that I wasted many hours of my youth in the dissecting-room that might otherwise have been more profitably and certainly more pleasantly employed. Technique, exact observation, and memory-training; true, all these are developed thereby, but when men tell me that after demonstrating anatomy for ten years or so they forget the finer details within a couple of years and only remember what is of practical importance to their surgery, then I ask, How much anatomical detail can you expect the average student to remember? I fully realise that the teach-

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ing of anatomy is a very different thing to-day, and as I have already said the mechanics of the living body are insisted on; an admirable plan. But is it fair to expect the student to carry the whole weight of the old anatomy in addition to the new. Are not some of us perhaps still under the influence of the Victorian dogma that what is unpleasant must be for our good? I have the temerity to suggest that the authority of the dead hand lingers, perhaps not inappropriately, in the dissecting-room.

AT BENCH AND BEDSIDE

I am struck however by the fact that whereas the percentage of rejections in the Conjoint examination in anatomy is generally fairly constant, the rejections in physiology of the same candidates at the same examination may fluctuate widely. This consistency for anatomy at a considerably lower level does speak well for its teaching of the subject, even if achieved at considerable expenditure of time. The physiology results on the other hand are perturbing—one can hardly blame the students since they proved themselves up to a reasonable standard in anatomy. One cannot reasonably blame the examiners since they have willingly submitted the questions and answers to an independent inspection which corroborated their decisions. One is reluctantly forced to the conclusion that there is something wrong with the teaching of physiology to medical students at the present time, and I suspect that in some schools it has departed from the lines suitable for the training of those designed to become doctors and not whole-time physiologists.

If so it is to be regretted, for there is no sounder foundation for medicine than physiology. This was formerly recognised officially by the University of Glasgow, when it called the chair of physiology by the name of the institutes of medicine. One of the great difficulties in physiology and pathology alike is that these subjects have grown so enormously that they contain a number of specialties so that it is hard to find general physiologists such as Foster and Starling or general pathologists such as Andrewes (to mention only those who have passed away) to take command of the whole department. Yet this is much to be desired if the educational needs of the medical student are to be adequately met.

Materia medica has been cut down almost to the vanishing point in most curricula, and rightly so. Now that the old type of apothecary has disappeared, doctors do not handle the raw materials from which medicines are made, and the time formerly occupied in learning about these can be more usefully employed. As to pharmacology I would commend to your notice the methods in vogue at Cambridge where the examination is conducted by pharmacologists and clinicians working in pairs. In this way the practical therapeutical aspect of the subject is kept to the fore.

In the clinical subjects systematic lectures could be reduced, if not entirely abandoned in favour of more clinical lectures and demonstrations, which are more stimulating at the time and make the subsequent reading of text-books more interesting. At the bedside every effort should be made to induce the student to build up his interpretation from physiological principles, thereby inducing him to develop his own powers of judgment. I have been struck with the unwillingness even of students who have done brilliantly in physiology to attempt this. They seem to think there is a deep gulf fixed between physiology and medicine. Recent attempts to bridge this gulf by illustrating physiology by demonstrating patients and by classes in applied physiology during the clinical period are in the right direction, and this is equally true for anatomy. I have repeatedly had occasion to remind students that there is a lot of common sense in medicine—it is not an esoteric mystery. In these ways we can encourage the gradual development of a balanced judgment, ready to accept new truth after critical investigation, and able to detect specious fallacies. Thus may our successors escape the pressure of the dead hand.

The introduction of a more psychological approach to a medical case has emphasised the necessity of considering the patient as a whole in relation to his environment. Obviously increasing specialism renders this at once more difficult and more essential. That physical symptoms may have a psychical origin and enable a psychical dilemma to be burked has become clearly recognised, and should always be borne in mind both in teaching and in practice. It has been said sardonically that the trouble with psychotherapy is the psychotherapists. Unfortunately there is an element of truth in this. "Who drives fat oxen must himself be fat" ran the old Latin tag. But I do not think it is true that he who treats psychoneurotics must himself be a neurotic. It may be urged that one who has solved his own conflicts can best help another to do the same. Whether he can also sufficiently regard the case unemotionally and objectively is more doubtful. Some of the soundest and sanest psychotherapists I have known had served an apprenticeship in general practice for several years before embarking on this difficult if fascinating specialty. I confess I view with some concern the undertaking of such work by recently qualified men with little experience of life and none of ordinary practice, equipped mainly with book knowledge and the formulas provided therein by ingenious theorists. Nor do the internecine quarrels between different schools of psychotherapy help much. It is particularly amusing to see one school assuming authoritarian airs of infallibility on a subject still in its infancy. The one god, the one prophet, the sacred books, the heresy hunt, and the solemn excommunication by bell, book, and candle; all the mediæval apparatus of orthodoxy, except the stake, are being recreated before our eyes.

Do not imagine that I am scoffing at psychotherapy. Quite the reverse; it can bring as much help on one side as biochemistry can on the other. I accept both, I reject neither. Primarily interested in physiology, and particularly, under the influence of Gaskell, in the sympathetic nervous system, I was next trained in the straitest school of organic disease under that great clinician Samuel Gee. Gradually I came to realise vaguely looming behind the endocrines, behind the autonomic nervous system itself, the great emotional centres, potent for ill and good alike. In this puzzled, frightened, and unhappy age in which we find ourselves, in this century which most unfairly blames the nineteenth for all its distresses, just as children blame their parents, the medical man will have more and more to usurp the province of the priest and try to bring mental and spiritual healing to a world which finds the panaceas of organised religions inadequate for its needs.

To have spent one's life in our profession during this time of ceaseless change has been a strenuous but absorbing experience. Looking back on the beginning of that professional life when the atom was still a solid lump, the elements immutable, X rays and radium unknown, blood counts rarely done, differential staining of a blood film only just starting, the first steps in endocrinology being falteringly undertaken, and the first dose of antitoxin just

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being administered, I turn round and view the future for medicine not only with confidence but with enthusiasm, despite conservatism within and credulity (oh, such credulity !) without.

ÆTIOLOGY OF PELLAGRA AND THE NUTRITIVE VALUE OF MAIZE

A REVIEW

THE acceptance of pellagra as a nutritional disease is largely due to the labours of Joseph Goldberger and his colleagues of the United States public health service in the long series of clinical researches carried out from 1920 to 1930. These workers narrowed the problem of the ætiology when they showed that a typical pellagra-producing "maize diet" could be rendered wholesome by addition of dried yeast. Their investigations also included much important experimental work on "black tongue," the disease characterised by anæmia, stomatitis, and diarrhœa, which is produced in dogs when fed on diets consisting largely of maize, resembling those on which human pellagra develops in regions where the disease is endemic. This disorder is considered, with justification, to be the canine analogue of the human disease; the amounts of different foods (yeast, milk, meat, eggs, &c.) which when added to the "maize" diets were found to prevent and cure black-tongue formed a series exactly parallel with the series that prevented and cured human pellagra. The preventive dietary factor for black-tongue was found not only in dried yeast but also in a protein-free yeast extract; it was resistant to autoclaving, and could be concentrated by adsorption on fuller's earth, as in the preparation of Goldberger's "P-P (pellagra-preventive) solid." More recent work has confirmed the above analogy; pellagra has been cured with autoclaved yeast by Spies and other workers in U.S.A., and good results have lately been reported from Egypt by Ellinger, Hassan, and Taha (1937a) with an aqueous yeast extract which had been autoclaved at 120° for five hours.

More recently, experiments at the Institute of Animal Pathology at Cambridge, carried out in collaboration with the division of nutrition of the Lister Institute, have shown that young pigs also fail to thrive on Goldberger's black-tongue maize diets and suffer from dermatitis and diarrhœa (Birch, Chick, and Martin 1937). Later the diarrhœa increases in severity, and is accompanied by complete loss of appetite; death ensues unless the diet is changed. Addition of autoclaved yeast extract renders the diets satisfactory and causes swift cures of gravely sick animals. Monkeys also sicken, develop diarrhœa, and die on Goldberger's maize diets (Harris 1937a), but rats thrive on them (Birch, Chick, and Martin 1937).

The fact that the material that renders such diets wholesome is present in an aqueous yeast extract suggested at once some connexion with the group of B vitamins, while its stability at high temperatures pointed to the portion of the B-vitamin complex which has been called vitamin B_2 (vitamin G in America), itself now known to be complex in nature. One constituent, lactoflavin (or riboflavin), has been isolated in the pure state, and at least two additional substances of nutritional importance are known to be present in an autoclaved yeast extract (Edgar and Macrae 1937). One of these is adsorbed on fuller's earth together with lactoflavin, but can be separated after elution; the second is found in the filtrate from the fuller's earth adsorption. Fractions with similar chemical and nutritive properties have also been isolated from sources other than yeast, such as liver extract and rice-polishings.

Not only yeast extract but also liver extract and preparations made from it have proved curative for pellagra and black-tongue (Voegtlin et al. 1920, Ruffin and Smith 1937, Fouts et al. 1936). Pure lactoflavin has no curative action for either disease (Dann 1936, Koehn and Elvejhem 1936, Sebrell et al. 1937). This pigment is one constituent of the yellow oxidation enzyme, the ferment widely distributed in living animal tissues discovered by Warburg and Christian. This enzyme, which is concerned with important oxidation processes normally occurring in living animal tissues, needs for its action the presence of a co-enzyme named by Warburg co-dehydrase II, and shown to contain nicotinic acid amide (combined with adenine and carbohydrate and phosphoric acid groups). Co-zymase, the co-enzyme which is specially concerned in the alcoholic fermentation of yeast, has a composition almost identical with that of co-dehydrase II, and both are contained in yeast extract. In the attempts to identify the nutritive essentials contained in yeast and liver extracts, attention was naturally turned to the co-enzymes and their constituents. A preparation of nicotinic acid amide, isolated from liver extract, was found a few months ago to cure black-tongue in dogs by Elvehjem and his colleagues (1937) at Madison; pure nicotinic acid also proved active. The significance of this discovery was obvious and reports of the treatment of human pellagra soon appeared. Fouts, Helmer, Lepkovsky, and Jukes (1937) describe the cure of 4 cases in the Indianapolis Hospital, maintained upon a diet on which pellagrins do not improve, when 0·5 to 1·0 g. nicotinic acid was given daily by mouth. Smith, Ruffin, and Smith (1937), working at the Duke University School of Medicine, Durham, North Carolina, give the details of a particularly interesting case of a man, aged 42, who had suffered from recurrent pellagra for fifteen years, and showed all the typical symptoms, including mental aberration. The nicotinic acid was given intravenously or intramuscularly in daily doses of 60 mg., with dramatic results. There was improvement in the appetite within 24 hours, in the mental condition after 48 hours, and in the skin and the face within 3 days, and the cure was complete in 12 days. Promising results have also been reported from Cairo with cases receiving 0·3 g. nicotinic acid daily by mouth (Hassan, see Harris 1937b), and the successful treatment of 15 cases by Dr. T. B. Spies at Cincinnati is described on another page of this issue.

Dramatic cures have been obtained at Cambridge (Chick et al. 1938) when pigs which had become gravely ill after being fed for 3–4 months on a pellagrous diet were given 60 mg. nicotinic acid daily. The appetite returned in 24 hours, the diarrhœa abated in a few days, the dermatitis cleared up, and a new coat of hair was grown. The pigs soon began to grow and put on weight at an accelerated rate, so that in 3 months they weighed as much as their litter-mates which had been properly fed.

NUTRITIVE VALUE OF MAIZE

What explanation do the above researches afford of the occurrence of pellagra among maize-eating populations? Experimental researches on the nutritive value of maize, as compared with that of other cereals, have been actively and continuously carried on ever since the association of pellagra with maize-eating was recognised as a fact. Attention was naturally first turned to the nutritive value of the

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maize proteins, seeing that a large part of these consist of zein, a protein which is deficient in the essential amino-acids tryptophane and lysine. The results of experimental work on this subject have indicated, however, that if enough is eaten the other proteins contained in the maize kernel, the glutenins and globulins, will make good the deficiencies of the zein. Nor as regards the content of known vitamins does maize seem to be inferior to wheat, for example. Vitamin A, of which only traces are found in wheat, is relatively abundant in the yellow variety of maize. The unmilled grains of both cereals are well supplied with vitamin B_1 and contain fair amounts of the vitamin-B_2 complex, with the exception of lactoflavin in which both are poor and maize poorer than wheat (Copping 1936). Lactoflavin deficiency, however, does not appear to be connected with the cause of pellagra.

Nicotinic acid, which may now be regarded as an hitherto unrecognised dietary essential, is a relatively simple compound, of composition $C_6H_5O_2N$ (pyridene β-monocarboxylic acid), and the work described above suggests that pellagra among maize-eaters may be due to a deficiency of nicotinic acid in maize, as compared with other cereals. No chemical methods are at present available for the estimation of small quantities of nicotinic acid in such substances, which would afford a direct answer to this question, and for the present the only evidence is that obtained from biological tests. In the experiments on young pigs at Cambridge, referred to above, the diet was found to be just adequate when the whole ground maize (83 per cent.) it contained was replaced by a mixture of whole wheat and barley, or when the pigs receiving a diet of maize and purified casein were bedded on wheaten straw of which they consumed considerable amounts.

As already stated, young rats will thrive on diets composed almost exclusively of maize if the whole grain be given; when milled maize is substituted the defects can be corrected by yeast extract but not by nicotinic acid, nor can nicotinic acid or nicotinic acid amide replace any of the separate B_2 vitamins required by the rat (Macrae and Edgar 1937, Cook, Clarke and Light 1937). Experiments on the rat, with which so much important nutritional research has been done in the past, have again afforded only misleading indications as to the ætiology of pellagra. The rat is evidently unsuitable for an investigation of the nutritive value of cereals for the human race, and the dog or pig seems to be a more suitable experimental animal for future work in this field.

SECONDARY PELLAGRA

A note is perhaps needed upon the relation of the above argument to the ætiology of the sporadic cases of pellagra arising among populations which eat no maize. These cases, usually known as "secondary pellagra," display symptoms similar to those of the endemic disease, and in the later stages may also show some degree of mental disorder. Secondary pellagra develops after a long period of illness in which the absorptive capacity of the digestive tract has been severely disturbed—e.g., after dysentery or long-continued diarrhœa, in alcoholic addiction, or after operation or cancer involving the stomach or small intestine. Diarrhœa is also a common symptom of endemic pellagra and the infestation with internal parasites that is often present is held by some investigators to be an important contributory cause of the disease (Ellinger, Hassan, and Taha 1937b). Many cases of secondary pellagra have been treated with yeast and liver extract as successfully as those of endemic pellagra, and an interesting example is published in our present issue by Dr. Yudkin, Dr. Hawksley, and Prof. Drummond.

The fruitful series of investigations by Spies and his co-workers at Lakeside Hospital, Cleveland, were carried out chiefly on cases of "alcoholic" pellagra. One may assume that in these cases the disease is caused by defective absorption of the essential dietary factor from diets in which it is not abundant, and medication with yeast or liver extract seems to be a useful preventive measure. There is, however, no satisfactory explanation of the fact that in the United States, where pellagra is endemic, addiction to alcohol should often be followed by this disease, whereas elsewhere polyneuritis, which may be curable by the antiberi-beri vitamin B_1 (Joliffe and Colbert 1936), should be the more usual result. Possibly a careful scrutiny of the diets might reveal the reason.

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PARIS

(FROM OUR OWN CORRESPONDENT)

MORE ABOUT THE 40-HOUR WEEK

THE hospital world is divided into two camps over the effects of shorter hours on the morals of the hospital staffs. Monsieur Mourier, head of the public hospital services in Paris, is the leading figure in one camp, and in his address to the Academy of Medicine on Dec. 21st he showed that the Paris hospital mortality had fallen slightly since the introduction of the 40-hour week. In both camps there are now said to be bulky dossiers of evidence, and however tempting it may be to suspect that the Mourier dossier contains a soupçon of official whitewash, we also have the declaration of Prof. Sergent, who, speaking with the retrospective impartiality of a surgeon on the retired list, paid a glowing tribute before the Academy to the remarkable devotion with which the great majority, if not all, of the subordinate members of hospital staffs fulfil their duties.

PROFESSIONAL SECRECY AND DEATH CERTIFICATES

The agenda of the annual meeting of the Confédération des Syndicats Médicaux Français put in a nutshell the most pressing problems with which the French medical profession is confronted to-day. One of these is the vexed question of the wording of death certificates. Article 378 of the penal code

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makes professional secrecy a duty and not merely a privilege for the doctor. His, therefore, the risk of saying too much rather than too little when he gives evidence in a court of law, signs a death certificate, or in any other way is maladroit in letting the cat out of the patient's bag. On the other hand, there is the scandal—not too strong a term by any means—of the many inaccurate and misleading death certificates in the past. To employ that overworked cliché, many of these documents are not worth the paper they are made of as far as the requirements of vital statistics are concerned. Hence the tightening up of the system which found expression in the circular issued by the Ministry of Public Health a year ago. The resolution adopted by the Confédération at its annual meeting seems to be a successful compromise between the public health official who wants nothing better than accurate vital statistics, and the general practitioner who wants nothing better than security against litigious persons anxious to pay him out for lack of discretion in the wording of the certificate of death of some relative. The resolution said, in effect, that the Confédération considered exact vital statistics "eminently desirable," that such statistics can only be provided by the confident collaboration of the doctor in the case, and that his assistance can only be invoked if he is assured that the system of notification adopted is at once practical, effective, and safe from the standpoint of litigation.

THE "OVERCROWDED" PROFESSION

Another problem discussed by the Confédération was the congestion in the medical profession, and two systems of weeding out undesirables attracted special attention. The one is to begin their eradication quite early by an examination at the end of the first year of the medical curriculum. The other is to keep the foreigner out. It was stated that the figures for the naturalisation of foreign doctors were 83 per cent. higher in 1937 than in 1936, and 486 per cent. higher than in 1935. With regard to the cruel competition of unqualified practitioners, a ray of hope was shed by the statement that though Monsieur Sellier is no longer Minister of Health, he is still a very live wire in the French Senate, and is bent on the promotion of a new law to deal with medical charlatanism. His views on this subject are said to be sound—in the eyes of the medical profession. It is hoped that one feature of the new law, if ever it materialises, will be State censorship of pharmaceutical publicity. What a Herculean job for the censor!

PENSIONS FOR DOCTORS

Yet another subject discussed was that of old-age pensions for doctors, and their compulsory retirement. It may be remembered that a certain Monsieur Pomaret has drafted a law providing for the retirement from practice of all doctors on the attainment of a certain age. The inherent injustice of this scheme under present conditions was its undoing, but its discussion has promoted the cognate idea of contributory pensions, and it is now proposed that though doctors should be allowed to retire at any age they please, they should be obliged to contribute to a pension fund. This fund might well be swelled if to each certificate they issued they were allowed to affix a 5-franc stamp, the revenue from this source to be earmarked for the pension fund. Evidently, however, there is considerable hostility to the idea of any pension scheme being involved in State machinery, and that the notion of linking up such a scheme with revenues from pharmaceutical specialties is anathema. A sliding scale of contributions to a pension fund, with the amount to be paid every year being proportional to a doctor's declared income, also finds little favour. It is curious how many snags appear when any pension scheme is discussed.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

SPEECH AND VOICE

A SERIES of lectures on the mechanics of speech and voice is being given by Dr. Robert Curry and Dr. Douglas Guthrie at the Edinburgh School of Speech Training and Dramatic Art. In the first of them Dr. Guthrie spoke of the importance of good speech and the need for a scientific study of speech, and pointed out that although there is a chair of music in every large university, there is not even a lectureship in speech in this country. Teachers are by no means unanimous about voice production, and the methods adopted and taught are numerous and varied, and sometimes even fantastic.

Dr. Curry described speech as a vital factor in the erection of human social systems. The division of labour, and with it the whole working of human society, is due to speech. "While many animals are capable of intercommunication by buzzing, whistling, or whining sounds, human speech varies from these sounds by its great differentiation. When we tell someone the address of a house he has never seen, we are obviously doing something which no animal can do."

In the second lecture Dr. Guthrie said that the production of the basic note of the voice by the vocal cords had been much studied and recently the instrument known as the stroboscope has furnished a more exact record of the vocal-cord vibrations than any previous means of investigation. The vocal note is moulded into the form of a speech sound in the cavities of the mouth and pharynx. The finished sound emerges from the mouth and the nose plays a very minute part in speech-production. Whatever their influence upon resonance, and even that is doubtful, the nasal sinuses cannot produce sound and their absence or destruction has no influence upon voice or speech.

ACCOMMODATION FOR PAYING PATIENTS

I referred last week to the opening of the Glasgow Royal Infirmary Auxiliary Hospital at Canniesburn, where there will be accommodation for 66 paying patients. This is an important development for Scottish voluntary hospitals and will be watched with keen interest The hospital at Canniesburn has the disadvantage that it is some distance from the parent hospital and cannot have quite as good laboratory and other services as are to be found in the main hospital. The managers of most voluntary hospitals would naturally prefer that if a paying patients block be constructed, it should be directly attached to the main hospital so that all the elaborate services available in the hospital are also immediately obtainable in the paying block. The difficulty of course is that most of the voluntary hospitals have little or no adjacent ground on which they can build and which would also be suitable for a paying block. Many of them, however, could build upwards, and the great advantage of high hospital blocks is

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that the medical staff have easier and quicker access to the various wards. This is a most important factor in the provision of efficient work by the staff.

BUDAPEST

(FROM OUR OWN CORRESPONDENT)

A CHEAP CURE FOR SCABIES

Dr. Antal Huber is using a new, quick method of treating scabies, discovered by Wernick of Germany and modified by the Hungarians, Kulchar and Weininger. The whole surface of the body, with the exception of the neck and face, is painted with 40 per cent. solution of sodium thiosulphate ("hypo"). After 15 mins. for drying, the skin is rubbed with 5 per cent. hydrochloric acid, this also being left to dry for 15 mins. The whole process is repeated and the patient puts on clean linen. On the next day the application is repeated in exactly the same manner. A course requires 120 c.cm. each of the thiosulphate solution and of hydrochloric acid.

Huber has administered this method in the most diverse forms of scabies and has obtained very quick and satisfactory results. So far he has treated 45 patients, from the mildest type to the most severe with pyodermic changes, and the results were uniformly excellent. Itching subsided even after an hour, and it completely ceased after 48–72 hours. The advantages of this method are many. It never provokes dermatitis, requiring after-treatment, even in those of very tender skin, as in young children. It does not soil bed linen and the underwear, which means a considerable saving in private homes as well as in hospital. Hospitalisation is much shorter, for patients are generally discharged in 3–5 days. The applications are not greasy and therefore the body linen does not adhere to the body, and thus it does not disturb the patient's sleep. The drug having no offensive smell, the patient's presence is tolerated by the rest of the ward. Finally, the drugs are incomparably cheaper than any drugs hitherto found successful.

CHRISTIAN MORALITY AND MEDICAL ETHICS

Latterly much has been written and spoken about introducing the regular teaching of medical ethics into the universities. Dr. Adam Bochkor, lecturer to the university here, insisting on the need for this, says that it would give would-be physicians a new orientation in the tangled problems of professional etiquette, besides giving the students, who perhaps deal too much with purely material things, a better knowledge of mental and spiritual aspects, which cannot be acquired, for want of time and opportunity, during the teaching of the special subjects. True medical ethics, Dr. Bochkor goes on, should be based, not on lay morality, but on Christianity—a very different thing. This close relationship makes it desirable that the subject should be taught by physicians well versed in Christian doctrine and living according to it.

COMPULSORY ANTITYPHOID INOCULATION

Because of the annual typhoid epidemics in Szeged it became imperative to introduce antityphoid inoculations. From August, 1936, till January, 1937, 15,427 contacts and carriers were inoculated. Then the Minister of Internal Affairs issued an order for compulsory inoculation, to be carried out first in the suburbs of the city and afterwards in the adjacent big farms. In the city 84 per cent. of the population had three injections and 4·7 per cent. only two. Out of the 45,450 inhabitants of the farms 90·1 per cent. presented themselves for inoculation. Severe reaction was observed in 2–3 per cent. of the children, while 6–8 per cent. of the adults complained of this. Having completed these protective measures, the city medical officers are now trying to reduce the incidence of typhoid to a minimum by improving the general health conditions of the city.

GRATUITOUS MEDICAL WORK FORBIDDEN

The Medical Chamber, constituted only a year ago, passed a resolution at its first general meeting, which came into force at the end of the year. According to this physicians must not work without payment in clinics or dispensaries that offer free medical attention. Only those patients can now be treated who produce a "poverty certificate" issued by a magistrate. Members of sickness insurance clubs must not attend these places, nor can paid private consultations be given on the premises, at the free out-door clinics, or in the public hospitals during the prescribed time of free consultations. No monetary compensation of any sort must be accepted from patients; the names of those who do this work must not be displayed anywhere; and the physician or other official who directs a patient to his or another's private consulting rooms commits a disciplinary offence. So strict is the rule about payment that it is an offence for a physician to return the salary, in any way, to the institute that employs him. The regulation governing the payment of physicians giving gratuitous consultations is to be established forthwith by the Chamber of Physicians.

MUSTARD-GAS FOR SUICIDE

At the Medical Society meeting in Debrecen Dr. T. Bodnár gave an account of a case that is probably unique. An official of the surgical clinic of Debrecen University committed suicide by drinking 5 c.cm. of "mustard gas." The initial symptoms, appearing eight minutes later, were vomiting, collapse, and diarrhœa repeating many times. The skin was ashen grey, and his heart's action became gradually worse, cardiac stimulants proving unavailing. Respiration became ever more and more superficial and intermittent, and he died after five hours. At the autopsy no erosion or ulcer was found on the mucous membrane of the stomach. The blood was thick and like lacquer. Because of the clinical symptoms, the post-mortem findings, the chemical analysis, and animal experiments the initial symptoms, which very much resembled poisoning caused by inhaling the vapour, cannot be due to local irritation, but may be attributed to the general action of the absorbed poison. The physician and nurses giving first-aid to the suicide themselves suffered injury from his vomit. The most striking among these lesions was on the lower arm of a nurse where a plaque could be seen, on which there was anæmia, hyperæmia, and œdema with vesicles at the periphery, detachment of the epidermis, and ulcer formation. Full recovery took place only after continuous treatment for 51 days. The attending physician removed the vomit from his hands by washing them with soap, and this proved to be sufficient protection, but the vesicles appeared on his upper arm where the skin was covered only by his shirt sleeve and his gown. Dr. Preininger performed animal experiments with the contents of the vesicles, and tried its effect on the skin of the nurse, but like the fluid from vesicles produced by mustard-gas itself, it was not poisonous.

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IRELAND

(FROM OUR OWN CORRESPONDENT)

THE DUBLIN HOSPITAL PROBLEM

IT is now more than two years since the Hospitals Commission—a body set up under the Public Hospitals Act, 1933, to advise the Minister for Local Government and Public Health on the disposition of the Sweepstakes Funds—recommended a certain line of policy in regard to the Dublin hospitals. In brief, it was that from six of the general voluntary hospitals of Dublin, varying in number of beds from 100 to 350, there should be developed four hospitals of approximately 500–600 beds each. The hospitals concerned gave enthusiastic support to the scheme and have been engaged ever since in pressing the Minister for his approval. He is believed to be in favour of the scheme, but the continued delay in announcing a decision is causing anxiety and some impatience. An alternative scheme was mentioned by the Commission, only to be considered if the scheme recommended should for any reason prove impracticable, the alternative being a municipal hospital to be supported by the rates. A certain amount of pressure has been brought to bear on the Minister to adopt this scheme, but he has to the present resisted the pressure, and has maintained that the voluntary hospitals have in justice the primary claim on the Sweepstakes Funds.

Prof. Henry Moore, speaking last week at University College, Dublin, gave expression to the anxiety which he and others are beginning to feel. He pointed out that as a preliminary to the development of the four large hospitals it had been recommended that a bed bureau to control admissions should be set up. The principle of the bed bureau had been accepted by the hospitals some sixteen months ago and a draft scheme submitted to the Minister. Twelve months elapsed before the Minister's department returned to the joint committee of the hospitals a fuller draft. This draft, modified on certain non-essential points, had also been accepted by the joint committees some months ago, but up to the present nothing more had been heard from the department. "Everybody admitted the urgency of the solution of the Dublin hospitals' difficulty," Dr. Moore went on. "For such a matter, and with the substantial measure of agreement already achieved by the different factors concerned, it was perfectly obvious that the delay in arriving at a solution was out of all proportion to the difficulties of the questions involved." He added that the delay was emphatically not due to any obstruction by the hospitals; on the contrary, they were most anxious and eager to operate the bed-bureau scheme, and to be permitted loyally to participate in the plan outlined by the Commission.

MEDICINE AND THE LAW

Nurse's Infection in Fever Hospital as an Accident of Employment

A DISEASE like anthrax, even before it was scheduled as an industrial disease, was held capable of being an accident within the meaning of the Workmen's Compensation Act. A workman sorting wool was infected by the bacillus passing invisibly from the wool into his eye. This, said the county court judge in Brintons *v.* Turvey, was of the same nature as the accidental entry of a spark from an anvil or the accidental squirting of scalding water or of some poisonous substance into the eye. An extension of this principle was advocated in a recent case at West Hartlepool, where a probationer nurse had contracted scarlet fever after being employed to nurse patients in the scarlet fever ward of the local isolation hospital. It was said that the fever inflamed the lining of her heart so that it would be very dangerous for her to attempt any more nursing; she would not be able to do work involving much lifting, walking, and standing. She might be fit for light work as a nurse-maid, but not for work as a general servant.

For the applicant it was contended that she must have contracted the scarlet fever in the course of her work in the hospital; the cases notified in the town at the material times were all in houses more than a mile away from the applicant's home; people who came to work at an isolation hospital were likely to contract scarlet fever; there was evidence that other nurses and the resident medical officer did so. The West Hartlepool corporation, the respondents, offered no evidence. The county court judge interpreted this fact as an admission by the corporation that there was a strong probability that the nurse contracted the infection in the hospital. The respondents were, it would seem, in some difficulty. On the one hand they disputed the allegation that the nurse became infected in the course of her work and they suggested that she might well have contracted the infection from some other source. On the other hand they argued that the liability of a nurse in a fever hospital to contract fever was such an obvious risk that she must have looked upon it as something highly probable; if so, it could not be called an accident. The judge, observing that his inclination was at present to find in favour of the applicant, reserved judgment in order to examine the authorities on the subject. Lord Macnaghten's famous dictum (in Fenton *v.* Morley) that the expression "accident" is "used in the popular and ordinary sense of the word as denoting an unlooked-for mishap or an untoward event which is not expected or designed" might seem to be in favour of the corporation. But there is ample scope for argument in the case.

Prescription Without Seeing the Patient

A fortnight ago the South-east London coroner criticised two brothers, a doctor and a chemist, during an inquest upon a child who died from pneumonia and heart failure. The deceased was a 3-year-old boy who was said never to have been very strong. The mother stated that on a particular Sunday the boy was very sick and she noticed a rash on his legs. Her husband went to fetch the doctor at 10.30 P.M. and was told by the dispenser that the doctor would be telephoned for and would be brought to the house by 11.30. The dispenser gave the father a bottle of medicine which he took home. The child died before there had been time to administer more than one dose. The doctor arrived at the house after the patient's death. It appeared that the dispenser who saw the father at the doctor's house was a chemist and optician, brother to the doctor and residing at the same address. In his evidence the chemist stated that, when the father called at the surgery on the Sunday evening, he telephoned to his brother. "He told me what medicine to give, and said he would be back in an hour; the medicine was bicarbonate of soda, salicylate of soda, syrup, and colouring." The coroner questioned the witness as to his taking charge of the surgery in the doctor's absence, which the witness denied. The doctor's evidence at the inquest was that there was an

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epidemic of measles in the neighbourhood and that he regarded the case as one of measles; he therefore instructed his brother to dispense a simple febrifuge. His brother had never dispensed for his patients except on his (the doctor's) instructions. The relatives were understood not to regard the case as urgent. The coroner expressed the opinion that the two brothers were not following the high standard of their professions. It was wrong to prescribe for this boy without seeing him. The doctor was not in a position to appreciate whether the boy's condition was critical or not.

Mania a potu as a Defence

Acute alcoholic insanity, *mania a potu*, was put forward as the defence to a charge of murder at Ipswich assizes on Jan. 22nd. Walter Smith, mate of a barge, was charged with the murder of his skipper in the barge cabin at Felixstowe dock last October. The dead man was found with two bullet wounds in the heart and one in the head. A medical witness, called on behalf of Smith, said that, if Smith shot the skipper, his condition was consistent with acute alcoholic insanity. An accused person is not obliged to disclose his defence in advance. Smith's defence—that, if he committed the act, he did so while suffering from *mania a potu*—was something with which the Crown had not previously been faced. In the circumstances the prosecution was allowed to call rebutting evidence. Dr. I. D. Dickson, medical officer at Norwich prison, said that *mania a potu* cases were rare; one symptom was an ungovernable fury, the spasm being followed by complete amnesia. Dr. Dickson said that, when he examined Smith, Smith was genuinely suffering from amnesia in respect of the events on the barge; the witness, however, found no trace of mental deficiency or insanity. Dr. H. Grierson, senior medical officer at Brixton prison, described the characteristic of *mania a potu* as wild fury or frenzy lasting about two hours. During that period the individual might commit acts of violence of which he would afterwards have no memory. *Mania a potu*, he added, was more likely to occur in a person not accustomed to heavy drinking. Mr. Justice Singleton told the jury that drunkenness in general was no excuse for crime. If a person fired a loaded firearm at another, it was presumed that he intended to do him grievous bodily harm or to kill him. If he was in such a state of drunkenness as to be incapable of forming any intent, the offence could be regarded as manslaughter instead of murder. After reviewing the medical evidence for the defence, the judge asked the jury if they could see any proof of insanity, or anything like insanity, in that evidence. The jury found Smith guilty of murder, and sentence of death was passed.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A BACTERIOLOGICAL BACK-NUMBER

V

MAN alone among the animals has been privileged to change his mind. The leopard thinks the same spotty thoughts and the chameleon displays himself to the same Angström units as they did in the Garden of Eden and if the whole zoo were planted back again into the Ark it is doubtful whether there would be any need to pick up the broken threads of history, unless indeed the modern pussies might like to tell their ancient brothers about their operations. But man, not being an entirely original animal, is given not only to changing his mind but to changing it back again. Thus his crazes and preoccupations are inclined to be recurrent. If in the Middle Ages he was mainly occupied with his soul, and in the nineteenth century with his purse, he has now passed into a phase when his attention is mainly focused on his body. This, of course, is no new thing. The Greeks had a word for it, though I've forgotten what it was. It is certainly remarkable that now after the lapse of 2000 years we can again maintain openly and without shame that health and beauty are the best aims of life. That great reality of the Middle Ages, the eternal soul, seems to have disappeared like a will-o'-the-wisp; it has been simply physiologised out of existence. But let not the mere materialist rejoice prematurely. It is in the nature of things that the cult of the body should have its innings and put up its score—a duck or a century, as the case may be, but it is also in the nature of things that the soul must some day return to its own and when that happens it will mean a lot of unemployment.

* * *

Apropos of this movement towards Health and Beauty I have just been reading the National Fitness Campaign supplement to the *Daily Telegraph and Morning Post*, which was published a few days ago. It is a dynamic and inspiring document. The day has clearly passed when we are content to say that it is a good thing to be healthy (and occasionally useful to be beautiful)—and to leave it at that. The supplement gets down to brass tacks and gives us a very comprehensive account of how to set about acquiring these precious blessings. An old-fashioned hygienist may well find the programme so full as to be confusing and it is not easy to give the gist of the matter in a few words. The following abstract is only put forward as a first approximation. The Prime Minister, the Minister of Health, and the President of the Board of Education give the movement their blessing (and they hope you will vote Conservative at the next election). The secretary of the British Medical Association and several other prominent medical men point out the importance of the doctor in the scheme (and we *all* hope you won't argue about the doctor's bill). Captain I. P. Muller, of the Muller Institute, explains how, by the methods of "My System 3*s*. 6*d*." that most critical problem of middle age—the golf swing—may be solved. The Minister of Agriculture and the Milk Marketing Board score what might be called a walk-over on the subject of dairy produce. "Anything from boot-polish to a hair dressing," we are told, can be called cream—and one might suspect often *is* called cream. For my own part I like my cream *au naturel*—from the cow and not the homogeniser—and tasting of Flora (and Fauna) and the country-green; but that I suppose is old-fashioned and insanitary. The president of the National Federation of Meat Traders' Association gives us an account of the hygienic importance of meat and there is an interesting article on the value of Optrex lotion as an aid to clear

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vision—a specially important preliminary, one would think, to the present campaign. Lastly there is an article headed "nutrition as a key to achievement" which may be said to sum up the Campaign and sketch its basic materials. Among the subjects here considered are Ovaltine, Shredded Wheat, Virol, Argentine chilled meat, and tinned food with special reference to Heinz's baked beans. For my own part I have always considered that Heinz's baked beans share with tinned asparagus the honour of being the acme of the tinner's art. It was interesting to note as illustrating the changing geography of the modern world, that all the constituents are "British, except for the tomatoes, which come from Canada." The tin we are told comes from Wales—though personally I always try to forget the tin.

Space forbids me to make any reference to the advertisement columns of the supplement, though the health instructions given therein are very complete and even more explicit than in the articles of the impartial experts. But sketchy and incomplete as my abstract has been, I think it will serve to give readers of THE LANCET an idea of the force and magnitude of this new National Campaign for Fitness and to convince them that this is no merely hypochondriacal and valetudinarian movement or that it implies any deterioration in the vigorous characteristics of our British race. It has big names behind it and it means big business. It has the advantage of being a movement that everyone can take an interest in, and bear his part in. Even if you are neither healthy nor beautiful and too infirm to trip it as you go on the light fantastic toe with Miss Prunella Stack or execute even one of Captain Muller's "daily dozen," you can at least follow the course of the movement in the stocks and shares column of your daily paper.

* * *

There are people who are ready to crab even the most laudable of causes and I have a somewhat bilious friend who holds that an individual or a nation can easily get too healthy—that an excess of animal spirits constrains individuals to assault the police and nations to go forth and blow up their neighbours. That too much consideration of health and beauty makes men "pansy" and women expensive to entertain, that there is a danger in playing with such powerful and little understood principles as these vitamins and things, and that one of these days some reckless nutritional experimenter will do something foolish, such as mixing his Guinness with his Ovaltine, and then the Lord only knows what will happen next!

* * *

In the penultimate article of the supplement Miss Vera Brittain gives a grand summing-up of the final aim of the movement in the words: "Nothing else than a race of men like gods should be the ideal of modern youth." This is surely a sufficiently ambitious aim for any movement. There is obviously plenty for us to get on with but for a start it might be well to get our ideas of theology straight.

*** *This concludes the five articles by A Bacteriological Back-number. Next month A Hospital Physician will be responsible for these columns.*—ED. L.

PUBLIC HEALTH

River Pollution and its Effects

THE Water Pollution Research Board has been engaged on a survey of the Tees since 1931 or earlier. This river was selected as being one on which the effects of not too heavy pollution, both in upper non-tidal and in lower tidal reaches, could be studied. The third report,[1] issued not long ago, deals with the upper section and completes the survey. The botanist (Mr. R. W. Butcher), the chemist (Mr. J. Longwell), and the zoologist (Mr. F. T. K. Pentelo) who collaborated have produced a valuable study of the chemical and ecological effects on an unpolluted stream of small and large increments of sewage effluent.

From its source to Middleton-in-Teesdale (23 miles) the river water is fairly soft and unpolluted. Animal and vegetable life is variable in amount—never plentiful—but the same species were found everywhere. Between Middleton and Croft effluents from several small sewage-works enter the Tees. Chemical and bacteriological evidence of pollution was accompanied by a change from an association of certain species of the diatom achnanthes and a green alga characterising the clean upper reaches to a variety of the diatom cocconeis associated with a blue-green alga (it may be remarked that the blue-green algæ were considered by the experts of the last Royal Commission on Sewage Disposal as being indicative of pollution of water). As the water recovered from pollution the diatom-green alga association reappeared. The fauna down to Croft varied but little in character, but tended like the flora to be more abundant in the lower reaches richer in food material.

The entry at Croft of the Skerne tributary bringing the sewage effluent from Darlington (72,000 inhabitants) as well as water of a naturally different character from that of the main river, raises the hardness of the water, as well as introducing pollution from which it does not completely recover. Flowering plants make their appearance with the fauna which they will support or indirectly encourage, and the microflora changes, although occasionally the community characteristic of up-river conditions reappears. Two vegetable organisms became dominant—the sewage fungus, *Sphærotilus natans* and *Cladophora glomerata*, the latter being characterised by long dark-green growths, unlike the pale green tufted form found in less polluted rivers and in the higher reaches of the Tees. Sphærotilus appears to flourish near sewage outfalls and cladophora in regions so far below outfalls that much of the organic nitrogen has been oxidised to nitrate.

The observations on the river have been supplemented by laboratory experiments designed to throw light on problems arising out of the survey, such as the effects of sewage and the products of its decomposition on brown trout, which form the most important fauna of the Tees. Deficiency of oxygen and the presence of sulphides appear to be the chief dangers; sewage itself, in moderation, had no directly toxic action.

The general impression gained from a preliminary study of this well-written report, illustrated by maps, views on the River Tees, and useful plates showing the forms of algæ, diatoms, and animals from it, is that the flora, and consequently the fauna, of a river contain only traces of plant food; the introduction of small quantities of nutriment (or pollution) will greatly increase the amount and variety of life, and, for example, allow trout to grow to a larger size; but with increasing animal and vegetable populations due to greater food resources there is danger of conditions so altering as to allow only the least desirable and lowest plants and animals to survive. These

[1] Department of Scientific and Industrial Research. Water Pollution Research Technical Paper No. 6. Survey of the River Tees. Part III. The Non-tidal Reaches—Chemical and Biological. H.M. Stationery Office. 12*s*. 6*d*.

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changing conditions are mainly associated with well-defined chemical characters. The high temperature coefficients of those biochemical changes that lead to increased oxygen demand, and of photosynthesis, whereby a source of oxygen supplemental to that absorbed from the air is provided, cause large seasonal variations in the water below polluted regions—much complicated at times by variable flow of the river.

This systematic study over some years, unique in its way, may serve principally to confirm views which have long been held and are at least latent in the literature of water pollution; but it is satisfactory to know that such views have been so fully confirmed.

Diphtheria in North-west Durham

The urban district council of Stanley (Durham) has asked the Ministry of Health to hold a public inquiry into the high prevalence of diphtheria in the area during the past five years. Various reasons prompted the councillors to support this course. One was of opinion the doctors were afraid to admit that the real trouble was malnutrition although, he said, "eminent medical men have agreed with me that malnutrition is the root cause of diphtheria in working-class districts." Others attributed responsibility to bad housing, overcrowding, and the deplorable state of the schools. One asserted that "certain statistics had led him to doubt the value of immunisation"; another felt that "immunisation is just another money making concern for the medical profession." The demand for an inquiry was solid save for one county councillor who advised waiting until a new medical officer was appointed. There may be some special reason for the high prevalence of diphtheria in north-west Durham, which an inquiry can elicit; but impartial inquiry will be difficult in such an atmosphere of prejudice.

Hygiene of Holiday Camps

Holiday camps are destined to play a great part in promoting physical fitness but they bring with them their own difficulties in the provision of drainage, refuse collection and destruction, water-supply, cooking facilities, and the prevention of overcrowding, both numerically and sexually. Mr. Herbert Brant (chief sanitary inspector, Cleethorpes), speaking at the Birmingham congress of the Royal Sanitary Institute, mentioned[1] the new powers for dealing with these matters given to sanitary authorities by the Public Health Act of 1936, but questioned their sufficiency if, as seems likely, the holiday camp becomes a permanent and common addition to the attractions offered by holiday resorts. Section 268 of the Act provides that a "tent, van, shed, or similar structure used for human habitation . . . so overcrowded as to be prejudicial to the health of the inmates" is a statutory nuisance. But there is no definition of overcrowding, as there was in the Housing Act, 1935, and it is clear from the phrasing that the definition used in the 1935 Act cannot be applied. Nor would it be altogether desirable, for some temporary overcrowding in a holiday camp might be tolerated in the times and circumstances in which it occurs. But obviously some limit should be fixed of what is allowable. In the present state of the holiday camp adventure the powers conferred by the Public Health Act, 1936, may be good enough to help in framing future policy, but as the movement grows further powers will be required. Meanwhile, the gross sanitary abuses of encampments of the past can be removed.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 15TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2289; diphtheria, 1659; enteric fever 29 (23 "expected"); pneumonia (primary or influenzal), 1647; puerperal pyrexia, 187; cerebro-spinal fever, 41; acute poliomyelitis, 8; acute polio-encephalitis, 1; encephalitis lethargica, 4; dysentery, 288; ophthalmia neonatorum, 92. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Jan. 21st was 4285, which included: Scarlet fever, 799; whooping-cough, 328; puerperal fever, 17 mothers (plus 9 babies); encephalitis lethargica, 281; polio-myelitis, 1. At St. Margaret's Hospital there were 19 babies (plus 6 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 44 (9) from measles, 6 (2) from scarlet fever, 23 (6) from whooping-cough, 44 (3) from diphtheria, 45 (13) from diarrhœa and enteritis under two years, and 91 (15) from influenza. The figures in parentheses are those for London itself.

Croydon reported the only death from typhoid. Liverpool had 19 deaths from measles, Salford and Wigan each 3. Liverpool also reported 7 deaths from whooping-cough, no other large town more than 2. Diphtheria was fatal in 32 great towns, Liverpool reporting 5 deaths. Bolton and Leeds each 4.

The number of stillbirths notified during the week was 259 (corresponding to a rate of 37 per 1000 total births), including 30 in London.

PANEL AND CONTRACT PRACTICE

Hospital Care Insurance in America

THOUGH the movement for compulsory health insurance in America still meets with formidable opposition, steady progress is being made in voluntary insurance, particularly in the provision of hospital care on a periodic prepayment basis. In this country we have seen during the past ten years a remarkable development of hospital contributory schemes, by which persons with incomes not exceeding certain limits can in return for small weekly payments receive hospital treatment without charge or inquiry into means. Such persons now number about ten millions. The American hospital insurance plans are, however, on very different lines, as we may learn from Dr. Rorem's brochure.[2] This form of insurance, which in America is often called group hospitalisation, was begun in 1929 by the Baylor University Hospital, in Dallas, Texas, which agreed to provide hospital services for 1500 school teachers, all of whom were members of a society paying cash benefits during periods of incapacitating sickness. The society increased the subscriptions of these members by the amounts necessary to pay the hospital $3 per semester for each member, in return for which the hospitals agreed to provide three weeks' hospitalisation, not including medical services, per year for each member requiring it.

The scheme was so successful that it was soon extended to other groups of employees, and it now comprises 18,000 persons. Within a few years the movement spread to other cities, and in 1933 it was approved, subject to certain conditions, by the American Hospital Association, which in 1937

[1] *J. R. san. Inst.* January, 1938, p. 454.
[2] Hospital Care Insurance. By C. Rufus Rorem, Ph.D. Chicago: American Hospital Association. 50c.

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appointed a committee, with Dr. Rorem as director, to further its objects. There are now nearly one million persons enrolled in hospital service plans, the prevailing type of which is one organised by a non-profit association offering to its subscribers free choice among a number of participating hospitals. The subscribers, the great majority of whom join the association in groups of employees, usually pay $10 yearly for a single subscriber, $18 yearly for a husband and wife, and $24 for husband, wife, and unmarried children under 19. The subscriptions are often deducted from the subscribers' earnings by their employer and paid by him to the association. There is no income limit and no medical examination on entry. Subscribers and dependants are usually entitled to the following benefits:—

Bed, board, and nursing service in a semi-private room; operating and delivery room service; laboratory analyses; X ray films and fluoroscopies; ordinary drugs and dressings; anæsthesia if administered by a hospital employee; basal metabolism tests, electro-cardiograms, serums, use of oxygen tent, &c.

These benefits are provided for 21 days in each year, and for illnesses of longer duration the hospital bills are reduced by one-fourth. The benefits do not include medical fees, and are available only for subscribers recommended by a doctor and treated by a doctor eligible to treat patients in the hospital chosen by the subscriber. The payments usually made by the association to the hospitals are at the rate of $6.50 per patient day, except in short stays, for which proportionately higher rates are paid.

This form of health insurance, which is known as "non-profit free choice hospital service," has not been officially approved or disapproved by the American Medical Association. It is gaining ground in America, and presents features that merit consideration in this country.

"Someone at the Hospital said"

An insured person had been treated from time to time by his insurance practitioner and on the morning of Sept. 16th he returned home from night work and vomited a quantity of blood. He also passed discoloured stools. He rested in bed until 9.30 A.M., when he visited the practitioner and told him of his illness. He became faint in the consulting-room and was given a restorative. The practitioner prescribed for him and offered to arrange for his admission to a hospital. The patient did not want to go to that hospital or to another suggested by the practitioner, but it was agreed that he should return home and think over the suggestion of hospital and if well enough should see the practitioner again on the following day. This he did and was given a letter for admission to a third hospital for which he had expressed a preference. He was admitted the same day, put on the danger-list, and died on Oct. 7th.

Complaint was made to the medical service committee that after the death of the insured person the relatives were informed at the hospital that "he entered the hospital a dying man." The committee were not able to inspect the death certificate but were told by the complainant that death was ascribed to gastric hæmorrhage due to gastric ulcer. The practitioner told the committee that so long ago as 1934 he had suspected the possibility of ulceration, but did not find that an ulcer existed. When the man called on Sept. 16th he formed the opinion that there had been hæmorrhage from the alimentary canal, but that the amount of blood lost was not great. The patient's pulse was 82, which was usual with him, and while there was slight tenderness of the stomach, there was no acute pain. At the hearing the practitioner produced a letter from the hospital which indicated that at an autopsy performed on the day following death no ulcer of the stomach was found, there were no varicose veins in the œsophagus, and it was not possible to ascertain the cause of the hæmorrhage. A copy of the case notes from the hospital indicated that when the patient was admitted he showed signs of gastric hæmorrhage and was somewhat restless; there was some epigastric tenderness and slight tension, pulse and temperature were normal, and the patient was not in extremis.

When these notes were shown to the complainant he agreed that they threw an entirely different light upon the matter. The committee thought it regrettable that if no ulcer of the stomach was found post mortem, the certificate should indicate death as due to hæmorrhage from an ulcer. No witnesses being present from the hospital it was impossible to investigate the alleged statement by someone there that the patient was a dying man when he was admitted. The committee expressed themselves satisfied that the practitioner had given proper medical care.

Bank Holiday Disability

An insured person had an attack of lumbago yearly round about August bank holiday. This attack had recurred five years in succession and for the past three years certificates of incapacity had been issued by the respondent doctor. The approved society eventually became suspicious and ascertained from the Ministry of Health that insurance stamps had been affixed to the man's contribution cards during weeks when he had been certified incapable of work. Further inquiries were made and it was found that the firm by whom the man was employed closes down each year for the bank holiday week, and that this week represented part of the period of incapacity on each occasion. He had actually worked, except for this closed week, each year and the practitioner was accordingly called upon to satisfy the medical service subcommittee that he had examined the patient and that the certification of incapacity was an expression of his genuine opinion based on these examinations. The practitioner told the committee that he had never issued a certificate of incapacity to the insured person without examination, that the symptoms described to him, coupled with evidence of stiffness and the presence of septic foci in his teeth, were all suggestive of the existence of muscular rheumatism. He had carefully examined the man and formed the opinion that he was unfit for his work. It is no part of the practitioner's duty to play the part of a detective and to make sure that the insured person does not work. He might have become suspicious if he had observed that the illness developed year after year at the same period of the summer, but if he had treated the patient at other times of the year for non-incapacitating illness the curious time-incidence of the lumbago might readily escape his notice. The main responsibility for detective work of this kind rests on the society which keeps records of the payment of sickness benefit.

DEMONSTRATIONS OF CONTRACEPTIVE TECHNIQUE. On Thursday, Feb. 3rd, at 2.30 P.M. at the C.B.C. clinic a practical demonstration of the technique of the use of a variety of contraceptive methods will be given by Mrs. Marie Stopes, D.Sc., and Dr. Evelyn Fisher. Medical practitioners and senior students should apply for tickets to the hon. secretary, C.B.C., 108, Whitfield-street, London, W.1.

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OBITUARY

OTTO LEYTON, D.Sc. Lond., M.D. Camb., F.R.C.P. Lond.

Dr. Leyton, who died on Jan. 21st at the age of 64, was one of that small group of consulting physicians who some thirty years ago approached clinical medicine through the training ground of the experimental laboratory and left their mark on the healing of the sick.

Otto Fritz Frankau was younger son of Joseph Grünbaum and Delia Frankau, and was born in London in 1873. He had much in common with his brother, A. S. Grünbaum, who was four years his senior and became professor of pathology at Leeds. Both began their education at the City of London School, and went on to Cambridge, the elder to Caius and the younger to Trinity. Here Otto took a first class in Part II of the natural sciences tripos, and before graduating in medicine from St. George's Hospital he had taken his D.Sc. at London University. After a succession of house appointments he went to King's College Hospital as clinical pathologist, and there acquired the intimate knowledge of laboratory methods and the interest in clinical research which he never lost. His keen intellect and ingenious mind often led him to theoretical suggestions which at the time seemed fanciful, but he lived to see many of them bear fruit, and was not ill pleased if someone else reaped the harvest. At this time he was on the staff of the Belgrave Hospital for Children and the Victoria Park Hospital, and he published papers on such different subjects as salivary secretion, membranous gastritis, the estimation of bile salts, and the treatment of empyema by negative pressure.

[Photograph by Bassano

In 1905 he was elected to the staff of the London Hospital on the medical side, and shortly afterwards he was appointed lecturer in pharmacology, using the opportunity to develop his study of metabolism in its widest sense. Before the discovery of insulin he had contributed substantially to the modern treatment of diabetes mellitus, and the three lectures which appeared in the *Clinical Journal* of March to May, 1917, may still be read with advantage. In the first of these lectures there is an instructive dialogue between Leyton (he had then just changed his surname by deed-poll) and a surgical colleague who asks: Are you going to tell us anything which I was not taught as a student? and Leyton sets out in a nutshell his conception of the disease. His book which first appeared in 1917 went through five editions, remaining essentially a monograph containing his own observations. He continued in the belief that diabetes is hereditary in the same way as tuberculosis is hereditary, some members of some families possessing pancreatic cells which are exceptionally susceptible to some poison. This book, like most of his writings, was not easy reading, but provocative and stimulating to a degree. These qualities are evident in the chapters on the internal secreting glands contributed to Price's Textbook of Medicine. Early in the war Leyton was struck by the cardiac symptoms in soldiers who had been exposed to shell-fire and noted the absence of evidence of disease of the heart; he satisfied himself that malingering played little part in its causation and was one of the first to evaluate the nervous origin of this disorder. Of medicine generally he had a wide knowledge, and although at heart a scientist he came to have a large clinical practice, although he never let it interfere with his interest in the theory of medicine or his close touch with medical literature. In 1929 he exchanged the lectureship of pharmacology for that of general therapeutics. He had also a very practical side which showed itself especially in his work on diabetes. He was one of the first to ensure the manufacture of insulin at the London Hospital in the early days when it could not be procured in this country, and only a day or two before his death he was engaged in getting its price reduced for his hospital patients. For long he had experimented with means of delaying the absorption of injected insulin, so that it should act over a longer period, and in this important aim he achieved a degree of success by using an emulsion of insulin in oil.

A man of deep feeling but great reserve, Leyton was widely known and liked, although few even among his own colleagues came to know him intimately. Those who did found him a staunch friend and one who concealed high ideals beneath a frankly realistic attitude to life. He married Doris Catherine M'Phail, who survives him with a son and daughter. In his early days he spent his holidays ski-ing in the alps; in later years he took great pleasure in open-air pursuits at the family's country home near Marlow.

WILLIAM GEORGE SYM, M.D. Edin., F.R.C.S.E.

BESIDES being one of the leading ophthalmologists in Edinburgh, Dr. Sym was actively engaged, particularly in his later years, in various branches of public service, as well as in the work of the Church of Scotland. He was born in Edinburgh in 1864, his father being a first cousin of Prof. John Wilson ("Christopher North") and a nephew of Robert Sym, W.S., the "Timothy Tickles" of the "Noctes Ambrosianae." He graduated in medicine in 1886, and took his M.D. in 1889. His connexion with the eye department of the Edinburgh Royal Infirmary began in the following year, and continued until 1920. He early obtained a large ophthalmological practice, and in addition to his appointment to the Edinburgh Royal Infirmary he was university lecturer on diseases of the eye and held appointments in Leith Hospital, and in the Eye, Ear, and Throat Hospital, being also for many years a director on the Royal Blind Asylum. For a time he edited the *Ophthalmic Review*, and he was also the author of a useful and well-known manual on diseases of the eye.

In recent years Dr. Sym gave much time and work to educational affairs in Edinburgh. He was a governor of Donaldson's Hospital, John Watson's Institution, and the Dean Orphanage, and he especially interested himself in the care and training of mentally deficient children. He was coöpted to

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serve on the education committee of the Edinburgh Town Council, as a representative of the Church of Scotland, and was one of the oldest directors of the Edinburgh Medical Missionary Society. In his earlier years he was a keen curler and golfer, but for some time he had given up these recreations.

Dr. Sym is survived by his widow, two sons, and two daughters. His elder daughter is an Edinburgh medical graduate and one of his sons is studying medicine.

ARNOLD WINKELRIED WILLIAMS, M.B. Edin., D.P.H.

Dr. Williams, who died at his home in Kemp Town, Brighton, on Jan. 18th, will be remembered as a prominent member of the old Dermatological Society and one of the leaders of dermatological thought at that time. Graduating with honours at Edinburgh in 1890, he travelled widely on the continent, working for some time at Hamburg with Unna, and returned to Edinburgh to demonstrate in physiology and assist in the lock wards at the Royal Infirmary. His first association with Brighton was as house surgeon to the Throat and Ear Hospital, and after a period as pathologist at St. John's Hospital, London, and clinical assistant at Blackfriars Skin Hospital, he was appointed physician to the skin department of the Alexandra Hospital for Children at Brighton, later becoming dermatologist to the Sussex County Hospital and St. John's Home. His early writings were on the rarer skin diseases; later he brought out an epitomised index of dermatological literature and published the notes on hygiene which embodied the lectures he gave for the East Sussex County Council. He was an enthusiastic follower of Unna and retained his conception of skin diseases, spending much of his time in examining the histological structure of the skin in health and disease. Latterly his activities had been limited by increasing deafness, but he maintained a reputation among his colleagues of being a particularly friendly and considerate man. He was in his seventy-fifth year.

THOMAS KENNEDY WHEELER, M.D. R.U.I.

FORMERLY surgeon to the Royal Victoria Hospital and later a more general practitioner of medicine, Dr. Wheeler was one of the oldest members of the profession in Northern Ireland, and his death two days before the end of last year removes a figure long familiar to Belfast men as a fine representative of an earlier generation. To Sir Robert Johnstone we are indebted for the following appreciation and recollections:—

"When Thomas Kennedy Wheeler died in his eighty-eighth year a very kindly and honest gentleman went to his rest. He was born in the purple, for his father was one of the most popular of Belfast practitioners, and T. K. found a practice awaiting him when he settled in his native city. He was attracted for a time by surgery and served the Royal Victoria Hospital as assistant and later as visiting surgeon. It was in the out-patients and later in the wards of that hospital that many generations of Belfast students and house surgeons learned to know him. Dogmatism and showmanship were alike foreign to his nature, and he never became the type of clinical teacher whose words are eagerly noted as a perfect answer to a possible examination question. He was rather the philosophic inquirer in surgery with a special interest in genito-urinary work. In those days—I am speaking of the 'nineties—before the urethroscope and cystoscope had come into their own, it was a pleasure to watch T. K. gently find his way through a so-called impermeable stricture, and a lesson in the advantages of a trained and delicate sense of touch. As one of his old house surgeons I can put it on record that no man could have been a more delightful chief to work under. He was always appreciative of anything done well, and when reproof was called for it was rather in the nature of a mild regret than of a reproach, however well merited. How many ardent young surgeons must have called to mind his constant question when considering an urgent operation: 'Lad, if it was your own brother, would you operate?' Partly, I think, because his temper made operative surgery more and more distasteful to him, partly because an increasing number of patients claimed his services as their family physician, he decided to resign his post as a surgeon to the hospital in 1902. Since then he led an ideal life—the respected friend and the trusted adviser of a wide circle of patients. He saw three sons gain honoured places in his own profession. Now he rests in peace, but there are still many to whom his is a pleasant memory."

GERALD TIERNEY, M.B. R.U.I., F.R.C.S.I.

Dr. Tierney, who died on Jan. 20th after a brief illness, was greatly liked and respected in Dublin. He graduated at the Royal University of Ireland in 1908, and was admitted to the fellowship of the Royal College of Surgeons in Ireland four years later. Choosing obstetrics and gynæcology as his career he became assistant master in the National Maternity Hospital, Dublin, and after three years there took up private practice, subsequently becoming assistant gynæcologist to St. Vincent's Hospital. A man of sociable disposition and a good tennis-player he made friends everywhere, and had the confidence both of his colleagues and of his patients. In 1931 his wife, who was a daughter of M. Blanche, French consul-general in Ireland, lost her life in a motor accident, leaving him with the care of six young children. A couple of years later he suffered from empyema complicating influenza, and had an illness lasting several months. He regained his health, but a few weeks ago developed symptoms of a cerebral tumour. His courage during the last seven years had increased the esteem and affection his personality had already won.

FEVER THERAPY

Dr. W. KERR RUSSELL writes: "As the number of doctors interested in artificial fever treatment is greatly increasing, I think it may be helpful to draw attention to a small error which appeared in the reprint of a very interesting article on fever therapy by Drs. P. S. Hench, C. H. Slocumb, and W. C. Popp, of the Mayo Clinic, in the *Journal of the American Medical Association* (1935, **104**, 1779). On p. 25 of the reprint there is a typographical misprint. In mentioning that in about 3 per cent. of cases having hyperpyrexia treatment there is protracted anorexia, nausea and frequent vomiting for a period lasting 24–48 hours, they say that "the condition can be promptly overcome by the intravenous administration of from 500–1000 c.cm. of 10 per cent. dextrose and 10 per cent. saline solution." This latter amount is incorrectly reprinted, and should read 1 per cent. saline solution. Though this article was published as long ago as 1935, it is still very often referred to and quoted."

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CORRESPONDENCE

THE MEDICAL PROFESSION IN NATIONAL EMERGENCY

To the Editor of THE LANCET

SIR,—May I draw the attention of members of the profession to a highly undesirable method that has been employed, in at least one area, to induce doctors to fill in the forms, recently sent them, inquiring what they would be willing to do in the event of a "national emergency." These forms were sent out by the British Medical Association. One doctor, who had not completed his form, subsequently received a letter of which the following is a substantial part :—

"It would be an extremely unpleasant duty for me to have to report that no return could be obtained from you and, therefore, that it was to be assumed that you are not prepared to help in any way in the event of a national emergency arising.

"I would also point out that those doctors who have been given choice of Home Service will be the last to be called upon, should an emergency arise, for active service abroad. Those doctors who have not returned their forms will probably not receive the same consideration."

In these words there are implications, though perhaps unintentional, which are regrettable and which your readers will perceive at once. The whole extract savours unpleasantly of an authoritarian régime. I am, Sir, yours faithfully,

London, W., Jan. 23rd. D. MCGAVIN.

CONTROL OF A TYPHOID EPIDEMIC

To the Editor of THE LANCET

SIR,—In your last issue Prof. Topley gave an exhaustive review of the available evidence on typhoid immunisation. He emphasised the value of sanitation and hygiene, pointing out the risks of inoculation during the incubation period, and the danger of provocation typhoid.

In May of last year I had the privilege of being in charge of the Basque refugee camp. The story of how these unfortunate children left Spain and arrived in England has been fully described in THE LANCET. They had been undernourished for many months, frightened by constant warfare, shaken by a rough sea-voyage, and finally herded into an emergency canvas camp crowded to capacity. The camp conditions were far from ideal and sanitation proved a very difficult problem. Two cases of typhoid were taken from the s.s. *Habana* on May 23rd and three more cases occurred up to June 4th. A major epidemic appeared inevitable.

Some years ago in general practice I had experienced two small outbreaks of enteric which were successfully controlled by contact inoculation, and I therefore decided to inoculate the Basque camp of roughly 4000 children and 300 adults; risking an occasional provocation typhoid in the hope that a general immunity might be obtained. There were no further cases of typhoid. All the proved cases had been in closest contact with the rest of the camp and it seems unlikely that no more cases were incubating. Typhoid is not prevalent in the Basque province and there is no reason to suppose that the rest of the children were immune. I suggest that mass inoculation prevented a major epidemic.

Prof. Topley visualises a future state under perfect public health control, where water is always pure and milk is pasteurised, so that the rôle of anti-typhoid inoculation is merely one of academic interest. In many parts of the world to-day cities are being blasted to pieces and the question of typhoid control must be of real practical interest. The British Government is making plans to evacuate our own children from densely populated areas to emergency camps if the occasion should so arise.

I have so much belief that inoculation controlled the Basque typhoid outbreak that I should not hesitate to repeat this measure under similar conditions. I am, Sir, yours faithfully,

Barnes, Jan. 24th. RICHARD TAYLOR.

INFANTICIDE

To the Editor of THE LANCET

SIR,—In your leading article last week it was implied that infanticide is usually a symptom of puerperal insanity. This view, although it was put forward by earlier authorities—e.g., Clouston—can scarcely be maintained now. The late Dr. J. H. Morton found that only three of the sixty-four women referred to Holloway between 1923 and 1932 because they had killed their "newly born" child had shown definite signs of insanity, and in two of these the patient's mental condition had cleared up by the time of the trial; six women had to be certified as mentally defective. This has an obvious bearing on any proposal that such women should be referred to a mental hospital. Measures of this sort would be more readily applicable to the numerically smaller group of those (formerly classed as suffering from lactational insanity) who have killed their child at a later period during the first year of its life; they are as a rule manifestly in need of institutional treatment, and have made up the majority of the cases of infanticide at Broadmoor.

I am, Sir, yours faithfully,

Bournemouth, Jan. 24th. HILDA LEWIS.

THE DANGERS OF THOROTRAST

To the Editor of THE LANCET

SIR,—In your last issue Dr. Leitner recalls that in 1932 he and his colleagues published in Germany the results of animal experiments with Thorotrast which led them to sound a warning against the use of this preparation in man. In the same year, at a meeting of the Royal Society of Tropical Medicine and Hygiene, Dr. Mather Cordiner and Dr. Hamilton Fairley [1] showed sections and X ray photographs of rabbits that had received thorotrast. At the same meeting I demonstrated [2] in rabbits and in human cases the effects of the preparation which, by the courtesy of the firm of von Heyden, I had been able to introduce for experimental purposes into this country from Germany in the previous year.

The dangers associated with the use of the substance were subsequently emphasised in a paper published conjointly with Whitaker and Davie [3] in which we concluded that the effects of the preparation, including those resulting from the intrinsic radio-activity of the thorium dioxide, could not lightly be dismissed and that its use should be restricted to cases in which the adoption of a fruitful line of treatment

[1] Cordiner, G. R. M., and Fairley, N. H., *Trans. R. Soc. trop. Med. Hyg.* 1932, 26, 318.
[2] Murgatroyd, F., *Ibid*, p. 323.
[3] Whitaker, P. H., Davie, T. B., and Murgatroyd, F., *Quart. J. Med.* 1933, n.s. 2, 49.

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depended entirely upon the exact diagnosis and localisation of lesions made possible by its aid. At that time we were not concerned with its use in neurological diagnosis; but it seems undesirable, where other methods are available, that it should commonly be so used without very careful consideration of its possible dangers.

I am, Sir, yours faithfully,

Harley-street, W., Jan. 24th. F. MURGATROYD.

MUMPS

To the Editor of THE LANCET

SIR,—In your annotation of Jan. 15th on the diagnosis of mumps, you refer to Dr. Smith's reminder that the trouble may manifest itself unilaterally, or may affect glands other than the parotids. I recently heard of a case in which a parotid had been incised, where the condition was not recognised as a specific fever.

I venture, therefore, to refer to a note of a test applicable to cases of mumps which was published in THE LANCET (1933, 2, 183). I have made frequent use of this test in epidemics among the boys at Worksop College, and have found that it is a help in determining the time when a boy may be allowed to leave the isolation block and return to school.

My experience is that mumps is one of the most contagious, as well as one of the most reliable of the fevers, and I have noted on many occasions that the second group of cases occurs with almost monotonous regularity on the twenty-first day after the first. I have come to rely upon this to such an extent that, rather than lose all the school fixtures for the rest of a term in which there is an outbreak, I have advised the headmaster to allow fixtures in the course of the incubation period to take place as usual. So far there have been no complaints from other schools, although these have always been notified of our predicament.

The incidence of orchitis, in my cases, has been about 20 per cent. in boys above the age of puberty, and this has been in cases confined to bed from the onset. The figure agrees with that found by the late Claude Ker in a much greater series of cases. I am seeking confirmation of an idea I hold, that when any complication, even orchitis, supervenes, the diastase in the urine persists at a higher level than normal until complete convalescence is established. If this can be shown to be correct it would seem to be likely that *apparent* subsidence of the parotid or pancreatic swelling cannot be relied upon as a criterion of non-infectivity.

I am, Sir, yours faithfully,

Worksop, Notts, Jan. 20th. GAVIN A. DUNLOP.

MEDICAL NEWS

University of Oxford

Dr. A. H. T. Robb-Smith is to be constituted Nuffield reader in pathology for five years from Oct. 1st, 1937. Dr. Robb-Smith was appointed assistant director of pathology under Lord Nuffield's benefaction last June (*The Lancet*, 1937, 1, 1437).

On Jan. 20th the following degrees were conferred :—

D.M.—A. M. G. Campbell.
B.M.—T. Gadian, C. W. Rayne-Davis, I. B. Pirie, and C. M. F. Walters.

University of Liverpool

On Thursday, Feb. 3rd, Sir David Wilkie will give the William Mitchell Banks memorial lecture in the surgery theatre of the medical school at 4 P.M. His subject will be chronic duodenal ileus. The lecture will be open to members of the medical profession.

University of Cambridge

On Jan. 22nd the following degrees were conferred :—

M.B., B. Chir.—*S. R. F. Whittaker, *J. B. Bunting, *D. O. Wharton, *B. D. Whitworth, J. K. Denham, E. H. L. Wigram, John Sutcliffe, A. S. Bookless, K. S. Mullard, D. A. P. Anderson, J. L. Griffith, C. F. Barwell, S. C. Truelove, A. L. Fawdry, A. P. Kitchin, J. L. W. Ball, G. A. Burfield, W. D. Deey, S. W. G. Hargrove, G. J. G. King, L. B. Paling, L. C. de R. Epps, H. S. Kellett, P. H. Lenton, G. E. Adkins, R. T. Johnson, S. A. H. Lesser, and G. H. Wooler.
M.B.—F. B. Turner.

* By proxy.

Applications are invited for a studentship for research in medicine which will shortly be awarded by the trustees of the Frank Edward Elmore fund.

The studentship is open to men graduates of any university who were born in any country within the British Empire except Scotland. The student will work under the regius professor of physic, and his commencing salary will be £300 a year. Applications should be sent to the regius professor of physic, department of medicine, University of Cambridge, before Feb. 28th. Further information will be found in our advertisement columns.

The Rockefeller Foundation has put £8000 at the disposal of the university for research in the department of experimental medicine. The money will be available over the next five years, but the amount drawn in any one year must not exceed £1600. It will be used for the salaries of a pathologist and a psychiatrist and to supplement the salary of the radiologist at Addenbrooke's Hospital.

University of London

At recent examinations the following candidates were successful :—

D.P.H.

Part I.—Samayapala Amarasinghe, P. H. R. Anderson, S. N. Chelliah, F. C. L. B. B. Crawford, P. A. Crowley, L. D. P. Dharmaratne, C. W. Dixon, R. Y. Dunlop, A. C. Gee, F. W. Gilbert, M. G. Hyder, O. G. Lloyd, A. L. St. A. McClosky, G. A. Macgregor, I. M. Macgregor, Morris Markowe, J. S. Minett, Frederick Noronha, P. X. O'Dwyer, S. S. Pillai, A. I. Ross, A. F. H. Stewart, Emily S. O. Thomson, S. C. Thurai-Rajah, Melville Watkins, and Helen E. Wight

University of Birmingham

Dr. Leonard Colebrook will deliver two Ingleby lectures in the medical lecture theatre of the university on Thursdays, Feb. 3rd and 10th, at 4 P.M. He will speak on the control of puerperal and other infections caused by hæmolytic streptococci. Members of the medical profession are invited to attend the lectures.

Carnegie Awards

Awards have been made from the Carnegie Fund to the following officers in the Colonial Medical Service :

Dr. C. J. Austin (medical superintendent, Central Leper Station, Makogai, Fiji), for the study of leprosy in Egypt, India, Malaya, and the Philippine Islands.
Dr. W. B. R. Jones (medical officer, Nevis, Leeward Islands), for a course in general surgery at Edinburgh University.
Dr. A. H. Lowther (Malayan Medical Service), for studies in ophthalmology in Europe, India, and Egypt.

Medical Society of Individual Psychology

The annual dinner of this society was held at the Florence Restaurant on Jan. 13th with Dr. H. C. Squires in the chair. Dr. R. D. Gillespie said that the society existed to help the general practitioner in the understanding of psychological problems. There appeared to be diversity of testimony in the different schools of psychotherapy, but underneath this apparent disunity he believed there was the unity of truth. The various schools of thought had passed through states of aggressiveness but there were now signs of a rapprochement. The great need of the present time was for a council to make decisions about nomenclature. Dr. Henry Harris, who deputised for Prof. John Macmurray, spoke on the necessity of the practitioner being sufficiently trained in psychotherapy to treat the early or minor forms of psychological illness just as he treated the minor forms of illness in other specialties—for example, ear diseases. If the practitioner did not treat these minor psychological complaints, who could? The consultant would ultimately benefit by the spread of knowledge, and so would the patient and the practitioner. The latter would come to treat his patient as a whole and not think separately of his body or of his

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mind. By means of the pamphlets it published the society had managed to arouse wide interest and it had many provincial doctors as members. Another thing the society encouraged was tolerance, for members were not expected personally to profess the Adlerian doctrines. Tolerance should be expected from psychiatrists, who ought to have a wider view of life than others. The chairman said that members of the society were encouraged to bring their own difficulties in treating patients for discussion. Dr. Cuthbert Dukes proposed the toast The Guests, and messages were sent to the president, Sir Walter Langdon-Brown, who was unable to be present, and to Prof. Macmurray.

Gresham College

Four lectures on diseases and their development will be delivered by Dr. V. S. Hodson at the College, Basinghall-street, London, E.C., at 6 P.M., from Feb. 1st to 4th. Admission to the lectures is free.

Hunterian Society

A banquet to commemorate the 210th anniversary of John Hunter's birth will be held at the May Fair Hotel, Berkeley-street, London, W., at 7.30 P.M. on Thursday, Feb. 17th. Further information may be had from the hon. secretary, Mr. A. E. Porritt, 27, Harley-street, W.1.

Institute of Hospital Almoners

The annual general meeting of this institute will be held at Westminster Palace Rooms, 44, Victoria-street, S.W., on Friday, Feb. 4th, at 6 P.M. when Dr. Henry Yellowlees will speak on voluntary social service. Further information may be had from the secretary of the institute, Tavistock House (North), Tavistock-square, London, W.C.1.

Health and Nutrition

A subcommittee appointed by the Industrial Christian Fellowship (4, The Sanctuary, London, S.W.1) to consider nutrition has issued an interim report, referring to evidence "which conclusively proves the great extent of real malnutrition, particularly among children and adolescents." It is pointed out that there has been a considerable rise in the cost of living, but no general and adequate rise in wages or relief.

Award for Cancer Research

At the annual dinner of the International Faculty of Sciences in London on Jan. 21st, Dr. S. Monckton Copeman, F.R.S., received on behalf of Dr. Ellice McDonald of Philadelphia the faculty's gold medal, which has been awarded to Dr. McDonald in recognition of the work he and his colleagues in Philadelphia have done, particularly in connexion with the effect of certain light rays on the growth of cancer tissue. This work was inspired by a communication on the treatment of cancer by "irradiated fluorescence" presented by Dr. Copeman at a London meeting of the International Cancer Conference. Dr. Copeman was elected an hon. fellow of the faculty and presented with a replica of the gold medal.

Dysentery at Bedford

The public health committee of Bedford reported last week to the town council on the recent outbreak of Sonne dysentery in the town (*Bedfordshire Standard*, Jan. 21st). On Jan. 5th five persons were taken ill with diarrhœa and vomiting after drinking milk on the previous day. Samples of milk taken from the farm and the retailer were sent to the county medical officer who reported that the cows were satisfactory. Nevertheless during the two days Jan. 4th and 5th symptoms of dysentery were reported in 59 households out of 105 supplied by that milk retailer. On Jan. 10th the Ministry of Health reported finding the Sonne bacillus in two of the samples of milk and in two of the excreta submitted. Efficient pasteurisation at the farm was then insisted on, the retailer being allowed to distribute after pasteurisation, but two days later the Ministry reported that a specimen of milk still contained the Sonne bacillus and the retailer was then prohibited from handling milk or milk vessels. It was regarded as probable that he was himself infected from drinking his own milk. No fresh cases were reported after Jan. 8th.

Medical Diary

January 31st to February 5th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY.

Pathology. 8.15 for 8.30 P.M.
Laboratory meeting at the Bland-Sutton Institute, Middlesex Hospital, Mortimer-street, W.

Orthopædics. 8.30 P.M.
Mr. C. Gordon Irwin and Mr. Norman Roberts: Fractures of the Metacarpals, Metatarsals, and Phalanges.

WEDNESDAY.

History of Medicine. 5 P.M.
Dr. H. B. Bayon: William Gilbert (1544–1603), Robert Fludd (1574–1637), and William Harvey (1578–1657) as Medical Exponents of Baconian Doctrine.

Surgery. 8.30 P.M.
Dr. S. C. Dyke: Treatment of Acute Streptococcal Infections. Mr. P. H. Mitchiner will also speak.

FRIDAY.

Otology. 10.30 A.M. (Cases at 9.30 A.M.)
Dr. H. MacCormac and Dr. Ewart Martin: Otitis Externa.

Laryngology. 5 P.M. (Cases at 4 P.M.)
Mr. W. G. Scott-Brown: Use of Radium in Hyperplastic Rhinitis.

Anæsthetics. 8.30 P.M.
Dr. H. K. Ashworth: Trend of Modern Anæsthesia for Upper Abdominal Surgery.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.
FRIDAY.—8 P.M. (West London Hospital, Hammersmith-road, W.), Clinico-pathological Meeting.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn-fields, W.C.
MONDAY.—5 P.M., Mr. T. W. Mimpriss: The Treatment of Retention of the Testis.
WEDNESDAY.—5 P.M., Mr. Harold Rodgers: The Endoscopic Appearances of Normal Gastric Mucosa and its Variations in Disease.
FRIDAY.—5 P.M., Mr. T. F. Todd: Rectal Ulceration following Irradiation Treatment of Carcinoma of the Cervix Pseudo-carcinoma of the Rectum. (Hunterian lectures.)

UNIVERSITY OF BIRMINGHAM.
THURSDAY.—4 P.M. (Medical Lecture Theatre), Dr. Leonard Colebrook: The Control of Puerperal and Other Infections Causes by Hæmolytic Streptococci. (First Ingleby lecture.)

UNIVERSITY OF LIVERPOOL.
THURSDAY.—4 P.M. (Surgery Theatre, Medical School), Sir David Wilkie: Chronic Duodenal Ileus. (William Mitchell Banks memorial lecture.)

GRESHAM COLLEGE, Basinghall-street, E.C.
TUESDAY, WEDNESDAY, THURSDAY, and FRIDAY.—6 P.M., Dr. V. S. Hodson: Diseases and their Development.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland-place, W.
WEDNESDAY.—3.30 P.M., Dr. L. R. Yealland: Maintenance of Health and its Relationship to Some Modern Factors.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
TUESDAY.—4.30 P.M., Prof. Arthur Ellis: Nephritis.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Dr. T. C. Stamp: The Bacteriology of Acute Respiratory Infections (I). 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Dr. J. G. Greenfield: Neuropathology.
THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration. 3.30 P.M., Prof. V. H. Mottram: Maternal Nutrition and the Pre-natal Child.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Prof. Lambert Rogers: Surgery of the Spinal Cord and Peripheral Nerves.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics, and operations, obstetrical and gynæcological clinics and operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY.—4.15 P.M., Mr. V. B. Green-Armytage: The Unexpected in Expected Normal Labour.
TUESDAY.—4.15 P.M., Dr. Geoffrey Konstam: Infective Endocarditis.
FRIDAY.—4.15 P.M., Mr. A. Simpson-Smith: Lecture.
Clinics, ward visits, and operations daily at 10 A.M. and 2 P.M.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY.—2 P.M., Dr. Donald Paterson: Causes of Chronic Vomiting in Infancy. 3 P.M., Mr. H. C. Apperly: Vitamins and the Teeth in Infancy.
Out-patient clinics daily at 10 A.M., and ward visits at 2 P.M.

ST. GEORGE'S HOSPITAL, S.W.
THURSDAY.—5 P.M., Dr. Antony Feiling: Neurological Demonstration.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY.—4 P.M., Mr. C. Gill-Carey: Simple and Malignant Growths of the Larynx.

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HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL.
WEDNESDAY.—4 P.M., Dr. R. S. Bruce Pearson: The Treatment and Management of Asthma Patients.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.
FRIDAY.—4.30 P.M., Mr. Philip Jory: Physical Medicine in Diseases of the Respiratory System (Upper Air-passages).

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY.—3.30 P.M., Dr. D. E. Denny-Brown: Localisation of Motor Function in the Cerebral Cortex.
TUESDAY.—3.30 P.M., Dr. J. Purdon Martin: Neurosyphilis (1).
WEDNESDAY.—3.30 P.M., Dr. F. M. R. Walshe: clinical demonstration.
THURSDAY.—3.30 P.M., Dr. C. Hinds Howell: Disseminated Sclerosis.
FRIDAY.—3.30 P.M., Dr. Denny-Brown: Localisation of Motor Function in the Cerebral Cortex.
Out-patient clinic daily at 2 P.M.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-st., W.C.
TUESDAY.—5 P.M., Dr. J. E. M. Wigley: Tuberculosis Cutis.
THURSDAY.—5 P.M., Dr. R. T. Brain: Electro-therapeutics. (Chesterfield lectures.)

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY to SATURDAY.—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in dermatology.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, S.W.
WEDNESDAY.—4 P.M., Mr. J. F. Firth: Evipan and Novocain Film.

LEEDS GENERAL INFIRMARY.
TUESDAY.—3.30 P.M., Mr. E. R. Flint: Demonstration of Cases.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY.—4.15 P.M. (Royal Samaritan Hospital for Women), Dr. Donald McIntyre: Prolapse and its Treatment.

Vacancies

For further information refer to the advertisement columns

Aberdeen University.—Lecturer in Bacteriology, £500–£600.
Army Dental Corps.—Dental Surgeons.
Blackburn County Borough.—Asst. M.O.H. and Asst. School M.O., £600.
Bristol City and County.—Asst. M.O.H., £500.
Cambridgeshire County Council.—Deputy M.O.H., £600.
Cambridge Univ.—Elmore Medical Research Studentship, £300.
Cardiff City Mental Hosp., Whitchurch.—H.P., at rate of £200.
Cardiff, Welsh National School of Medicine.—David Davies Professorship of Tuberculosis, £1500.
Chesterfield and North Derbyshire Royal Hosp.—Cas. O. and Fracture H.S., at rate of £200.
Croydon County Borough.—Asst. M.O. for Obstetrics, £350.
Derbyshire Royal Infirmary.—Three H.S.'s for Special Depts., each £150.
Dewsbury and District General Infirmary.—Sen. and Second H.S., at rate of £200 and £150 respectively.
Ealing Borough.—Asst. M.O.H., £600. Also Res. Asst. M.O., £350.
Eastbourne, Royal Eye Hosp.—H.S., £100.
East Ham Memorial Hosp., Shrewsbury-road, E.—H.P., at rate of £150.
Elizabeth Garrett Anderson Hosp., Euston-road, N.W.—Med. Reg., £100.
Finchley Borough.—Maternity and Child Welfare, Asst. M.O., 1½ guineas per session.
Folkestone, Royal Victoria Hosp.—Hon. Asst. Surg.
Glasgow, Victoria Infirmary.—Two Jun. Asst. Physicians, each £150.
Gloucestershire County Council.—Deputy County M.O.H., £750. Also Asst. County M.O.H., £500.
Guildford, Royal Surrey County Hosp.—Hon. Surgeon and Gynæcologist. Also Hon. Surgeon.
Hosp. for Sick Children, Great Ormond-street, W.C.—Asst. Pathologist, £400. Two Anæsthetists, each 15 guineas. Also Res. Aural Reg., £150.
Huddersfield Royal Infirmary.—Cas. O., at rate of £200.
Iraq Government.—Obstetrician and Gynæcologist, 150 Dinars per mensem. Also Ear, Nose, and Throat Specialist and General Surgical Specialist, each 120 Dinars per mensem.
Leicester Royal Infirmary.—Part-time V.D. Officer, £350.
Leicestershire and Rutland Mental Hosp., Narborough.—Deputy Med. Supt., £750.
Liverpool and District Hosp. for Diseases of the Heart.—H.P., at rate of £100.
Liverpool, Stanley Hosp.—H.S. and Gynæcological H.S., each at rate of £100.
Liverpool, Royal Babies Hosp., Woolton.—Res. M.O., £125–£150.
London County Council.—P.H. Dept.: Asst. M.O., £750. Asst. M.O.'s, Grade I and Grade II, £350 and £250 respectively. Also Temp. Visiting M.O., at rate of £150.
London Hosp., E.—Med. and Surgical First Assts. and Regs., each £300. Also First Asst. to Dept. of Thoracic Surgery, £150.
Lord Mayor Treloar Cripples' Hosp., Alton.—Third Res. M.O., at rate of £150.
Manchester, Ancoats Hosp.—Cas. O., £150. Also two H.S.'s to Special Depts., each at rate of £100.
Manchester, Duchess of York Hosp. for Babies.—Sen. and Jun. Res. M.O.'s, at rate of £125 and £75 respectively.
Plymouth, Prince of Wales's Hosp., Greenbank-road.—H.S., at rate of £120.
Plymouth, Prince of Wales's Hosp., Lockyer-street.—H.S., at rate of £150.
Pontardawe Rural District.—M.O.H., £800.
Preston, Wrightington Hosp., Appley Bridge.—Jun. Asst. M.O., at rate of £300.
Queen Charlotte's Maternity Hosp., Marylebone-road, N.W.—Res. Anæsthetist, at rate of £100. Res. Anæsthetist and Dist. Res. M.O. Also Asst. Res. M.O., at rate of £90 and £80 respectively. Also Res. M.O. for Isolation Hosp., at rate of £200.
Radium Institute, Riding House-st., W.—Res. M.O., at rate of £250.
Rochdale, Birch Hill Hosp.—Jun. Res. M.O., at rate of £225.
Royal Naval Dental Service.—Dental Officers.
Royal Naval Medical Service.—M.O.'s.
Royal Northern Hosp., Holloway, N.—H.P., also Obstet. H.S., each at rate of £70.
Ruthin Castle, North Wales.—Res. Phys., £200.
St. Albans and Mid-Herts Hosp.—Con. Physician and Con. Surgeon.
St. Bartholomew's Hosp., E.C.—Chief Asst. in X Ray Diagnostic Dept., £400–£500.
St. John's Hosp., Lewisham, S.E.—Phys. and Cas. O., at rate of £100. Also Med. Reg., fifty guineas.
Sheffield, Lodge Moor Infectious Diseases Hosp.—Jun. Asst. M.O., £300.
Surrey County Council Mental Hosps. Service.—Jun. Asst. M.O., £350.
West London Hosp., Hammersmith, W.—Med. Reg., £100.
Windsor, King Edward VII Hosp.—Res. Surg. O., £200.
Wolverhampton, New Cross Hosp.—Res. Asst. M.O., £200.

Medical Referees under the Workmen's Compensation Act, 1925, for the following County Court Districts: Sheffield and Rotherham (Circuit No. 13). Pontefract (Circuit No. 13). Harrogate, Ripon, Tadcaster, Helmsley, and York (Circuit No. 14). Applications should be addressed to the Private Secretary, Home Office, Whitehall, S.W.1, before 14th February.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Hampstead (London), Saffron Walden (Essex), and Swinton (York, W.R.).

Births, Marriages, and Deaths

BIRTHS

HARVEY.—On Jan. 23rd, at Edinburgh, the wife of Dr. E. I. Bruce Harvey—a son.
MARTIN.—On Jan. 21st, the wife of Dr. Nesbitt Martin, Harrow—a son.
MCCALLUM.—On Jan. 23rd, at Leigham Court-road, S.W., the wife of Dr. A. G. McCallum—a daughter.
WHYTE.—On Jan. 23rd, at Bloomsbury-street, W.C., the wife of Dr. Alexander F. Whyte—twin daughters.

DEATHS

BOTT.—On Jan. 21st, at a London nursing home, Robert Henry Bott, C.I.E., F.R.C.S. Eng., Lt.-Col. I.M.S., retd.
DRINKWATER.—On Jan. 20th, in a London nursing-home, Ernest Harold Drinkwater, L.S.A., of Wimpole-street, W.
HARDING.—On Jan. 17th, at Redhill, Lionel Nicholson Harding, M.B. Camb.
LAUDER.—On Jan. 19th, at his home, Robert Enwraight Lauder, M.D. Durh., F.R.C.S. Edin., D.P.H., late M.O. of H. for Southampton, in his 74th year.
LEYTON.—On Jan. 21st, Otto Fritz Frankau Leyton, D.Sc., M.D. Camb., F.R.C.P. Lond., Physician to the London Hospital, of Portland-place, W.
MACKAY.—On Jan. 23rd, at Berwick-on-Tweed, William Bertie Mackay, C.M.G., T.D., M.D. Edin., J.P. (Lieut.-Col., R.A.M.C., retd.), aged 74.
NOCKOLDS.—On Jan. 20th, at West Tarring, Worthing, William Stephen Nockolds, L.R.C.P. Edin., F.C.S., aged 86.
REILLY.—On Jan. 21st, Frederick Bradshaw Reilly, M.R.C.S. Eng., of South Hackney, son of the late Dr. F. J. Reilly, of Victoria Park-road.
ROWLAND.—On Jan. 22nd, at Reading, Edward W. S. Rowland, M.R.C.S. Eng., second son of Charles Brown Rowland, formerly Vicar of Wolverly, Worcs., aged 64.
SCOTT.—On Jan. 19th, at Dumfries, James Scott, Lt.-Col., I.M.S., retd., in his 79th year.
STANTON.—On Jan. 25th, at Whitehall-court, Ambrose Thomas Stanton, K.C.M.G., M.D. Toronto, F.R.C.P. Lond., D.P.H., D.T.M. and H., Medical Adviser to the Secretary of State for the Colonies, aged 62 years.
TOYE.—On Jan. 25th, at Stanhope, Bideford, Devon, Edwin Josiah Toye, M.D. Lond., F.R.C.S. Eng., aged 66 years.
WILLIAMS.—On Jan. 18th, at Kemp Town, Brighton, Arnold Winkelried Williams, M.B. Edin., D.P.H., dermatologist to the Royal Sussex County Hospital, aged 74.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

INDEX TO "THE LANCET," VOL. II, 1937

THE Index and Title-page to Vol. II, 1937, which was completed with the issue of Dec. 25th, is now ready. A copy will be sent gratis to subscribers on receipt of a post card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

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NOTES, COMMENTS, AND ABSTRACTS

MEDICAL EXAMINATION FOR WORKMEN'S COMPENSATION

By A Claims Official

While most insurance companies make use of the services of their own medical examiner for the purposes of life assurance, it is customary in connexion with claims made under the Workmen's Compensation Act to request a general practitioner in the district to examine the injured workman, the company's decision being based upon his report. While the primary object of this report is to give an expert opinion on an injury or physical condition, its value will be enhanced by some knowledge of the general principles of compensation as set out in the Acts 1925–26. From my own experience in examining reports submitted to insurance companies I would say that the value of about half of them is diminished by failure on the part of the examiners to appreciate fully the object for which these reports are required. While medical men cannot be expected to be quasi-lawyers, any doctor who is regularly requested to examine workmen for insurance purposes would benefit by a study of the relationship existing between workmen and employers, and the part played by the insurance companies in connexion with accidents arising out of and during the course of employment.

It is usual for a claimant for compensation to be asked to submit himself for examination.

(1) Where there is doubt whether the alleged incapacity is due directly to the injury or industrial disease complained of.

(2) Where incapacity appears to have been unduly protracted.

(3) Where the injury is a serious one and it is desired to estimate the extent of future incapacity also the degree of permanent incapacity, if any, which may result.

Many insurance companies issue to their medical examiners a special type of form for use in connexion with these examinations, and although such forms may be a useful guide to the examiner who has had little experience their value is diminished by the tendency to limit the report and confine the examiner within certain bounds. The model report should contain the following information:—

(*a*) Brief history of the case as supplied by the claimant.

(*b*) Note of his general physical condition.

(*c*) Report on the injury or disease itself as indicated by examination.

(*d*) An opinion whether there is any other medical condition present affecting the claimant's incapacity for work or tending to retard his recovery.

(*e*) Whether, in the opinion of the doctor, the claimant is at the time of the examination totally or partially incapacitated, and if the latter, the degree of incapacity.

(*f*) Whether any permanent incapacity is likely to result.

Before a medical practitioner can give a useful decision on incapacity and supply a full report on the lines indicated above, it will be necessary for him to have a knowledge of the claimant's employment, as the same injury may incapacitate a man for one class of employment and cause little or no incapacity in another grade of work or only partially so.

Having completed his report, should the examiner submit it to the company with a covering letter? I think this is usually appreciated, as although the necessity for such a letter may not be obvious if the report is complete there is often information useful to the company which could not be included in a report that may have to be shown to the claimant's solicitor or otherwise made use of. The examiner, for example, may wish to point out some course of treatment from which the claimant might benefit, or some external influence which may be retarding his recovery. The examiner may be in a position, should he be requested, to arrange for a course of treatment at a hospital, either as in-patient or out-patient—e.g., in the case of industrial disease such as dermatitis. The covering letter gives the doctor the opportunity of saying a word in confidence about the claimant's morale and the possibility of malingering.

Acting on the findings of the medical examiner, the employer or his insurers may reduce or terminate compensation, under section 12 of the Act, but it is necessary to serve upon the claimant, within six days of examination, a notice of intention with a copy of the medical report, and the man has a period of ten days in which to appeal against the notice.

A certificate containing all the necessary information might be set out as follows:

MEDICAL CERTIFICATE

Workmen's Compensation Act, 1925.

Name of workman:
Address:
Occupation:
Name of employer:
Date of accident:

I hereby certify that on the date indicated below I examined the above-named workman and that in my opinion:

*(*a*) He has fully recovered and is fit to resume his former occupation.

(*b*) He has partially recovered and is fit to perform such work as..... and his inability to resume his former occupation is (is not) due to the above accident.

(*c*) He is unfit for work but has fully recovered from the effects of the accident and his present incapacity is in no way connected therewith.

The grounds for my opinion are: .....

* Please strike out paragraphs which are inapplicable.

Should the workman dispute the findings of the medical examiner within the stipulated period, the employers may not reduce or terminate compensation except as the result of the findings of a medical referee appointed by the Home Office. Special regulations apply to the conduct of claims in respect of industrial diseases, and compensation may be claimed in respect of death or disablement caused by an industrial disease which is scheduled under the Act. A schedule of these diseases is contained in an appendix which is added to from time to time. A useful précis of the main provisions of the Acts is given in the Home Office "Memorandum on the Workmen's Compensation Acts 1925–31." Insurance officials, I find, are apt to grade medical men into two classes, the optimists and the pessimists. Many doctors take an unduly gloomy view of certain injuries and provided there is any degree whatsoever of incapacity they are prepared to certify the workman as totally incapacitated, with little respect to the nature of the work on which he is engaged. Insurance companies want an unbiased report without sympathy, although they welcome personal advice to the claimant by the examining doctor, given not in any official capacity but in a confidential and friendly way.

THE MEDICAL DIRECTORY—A WARNING

Messrs. J. and A. Churchill Ltd. write: "We wish to warn medical practitioners, particularly in the Edinburgh neighbourhood, against a man who is visiting doctors' houses, and who asks for the revision of a slip giving details of name, address, &c. He states that this information is required for the Medical Directory, and at the same time asks for some payment to be made to him. No charge is made for the insertion of name, address, qualifications, &c., in our directory, and therefore no person has our authority for making such a request. We shall be grateful for any further information that will enable us to put an end to the activities of this individual."

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LIGHTING AND STERILISATION OF OPERATING-THEATRES

THE modern tendency in the planning of operating-theatres is to have them as empty as possible. Anæsthetisation, sterilisation of instruments and the washing and gowning of the personnel can most conveniently take place in adjacent rooms. Apart from the instrument and anæsthetic apparatus, the main provision that has to be made is for artificial lighting.

The Elliptical Arch made by André Walter, of Paris, is a device whereby a powerful light is focused on the operation field by means of a lamp and reflector placed outside the theatre. The projector, which is the only moveable part of the apparatus, stands on a small platform, 8 ft. high. It consists of a powerful lamp of 500 or 1000 watts, partly silvered and placed behind a water-screen constantly cooled by a radiator attached to it. The lamp and its water-screen swing on a carriage which moves on rails. The light from the front of the lamp passes through the water-screen and then through a window into the theatre. The roof of the theatre is an elliptical arch of hammered stainless steel, without fixtures of any sort. The light leaving the front of the lamp is reflected from this elliptical surface to a focus directly in the operation field. But light is also sent out from the back of the lamp, and this is diverted by a reflector so as to impinge on an area of the ceiling surface of about 20 sq. ft., from which it is reflected down into the wound. By movements of the lamp this beam can be directed at will, and the light produced by the double beam is said to be almost shadowless, deep cavities being perfectly illuminated. Safety lighting is ensured by a second lamp which lights automatically if the first fails. If desired a gallery can be placed above the elliptical ceiling, with a slot closed by double plate-glass. Through this slot, at a distance of 6 ft. 6 in. from the operation field, a good view is obtained along the luminous rays reflected downwards from the roof.

Despite efforts in modern operating-theatres to eliminate dust-collecting surfaces and to mask everything but the eyes of the staff, tests have proved that the air of theatres, especially during occupation (which means during the progress of the operation) is heavily infected. Working in Durham, N. C., Deryl Hart found that in wound infections *Staphylococcus aureus* was the most constant infecting organism (*Arch. Surg.* 1937, **34**, 874). The organisms entered the wound from the air rather than from the skin of the patient, and the same organisms were found in the air of the theatre as in infected operation wounds. The main factors bearing on the contamination of the air were the numbers of persons occupying the theatre, the length of their occupancy, and the proportion showing infections of the nose and throat. At times as many as three-quarters of the operating-room personnel were found to have *Staph. aureus* (often of the hæmolytic type) in the nose and throat, and by attention to the masking of the nose and mouth, by reducing the number of persons in the theatre and by excluding all carriers of *Staph. aureus* and of streptococci the contamination of the air was substantially lessened. These measures of control of the source of the infection were combined with frequent painting of the walls of the rooms and daily washing with antiseptic solution, and with forced ventilation of the contaminated air and its replacement by clean washed air taken from above the roof. Even all these steps, however, did not reduce the incidence of infection of wounds to a satisfactory level, and the air is now sterilised after and during operations by special bactericidal ultra-violet irradiation. It is found that the ultra-violet rays will kill sprayed cultures (*Staph. aureus* and mixtures of organisms) at a distance of five feet within 1–5 minutes. With the tubes burning, almost no organism could be recovered from the air within a radius of eight feet from the operative field. Hart says that all patients operated on under irradiation from the tubes have had an unusually smooth convalescence. The wounds are never infected and there is no appreciable burning effect.

The makers of the Elliptical Arch (represented in England by Paul Dieny, 38 Delaware Mansions, London, W.9) have also designed a method of sterilising the air of operating-rooms. By their Sterilair system the air is drawn at floor level into the apparatus four times an hour, cleaned, and passed out at the ceiling. The type of sterilisation is described as "purely electrical" and the air is said to be "ozonised." It can also be heated, cooled, dried, or humidified.

POST-OPERATIVE HYDRÆMIA

IN a group of 35 patients suffering from various (mainly intra-abdominal) lesions V. Jura has tried to determine the variations in the composition of the blood after treatment by surgical operation (*Policlinico*, Dec. 15th, 1937, p. 646). In 10 patients examined immediately after the operation there was a fall in the water content and an increase in the sodium chloride (in other words some degree of concentration) of the blood. An exception to this rule was noted in the case of partial gastrectomies, in which the exact opposite occurred.

During the early post-operative period there was always a steady decline in the water content of the blood, especially pronounced in the patients who had shown the highest degree of hydræmia before operation. With return to a normal diet, and in proportion to the amount of fluid ingested, this fall gave place to a rise which continued until the pre-operative level was reached. The partial gastrectomy cases, on the other hand, showed an increase of hydræmia during the first three days after operation, probably because they all received large amounts of saline by intravenous or rectal infusion; and the return to normal diet was in these cases associated with a fall in the water content of the blood, despite the increased quantity of fluid taken by mouth. From this fact Jura argues that hydræmia is influenced to some extent by the organ operated upon, as well as by the introduction of fluid artificially into the body; but the findings presented seem to us to be sufficiently explained by the differences in management of the cases.

Appointments

BLAKE, B. AILEEN, M.B. Lond., D.C.O.G., Gynæcological Registrar at the Royal Free Hospital.

BOYD, MARY D. A., M.B. Glasg., Assistant Medical Officer of Health for Rotherham.

BROCK, J. F., D.M. Oxon., M.R.C.P. Lond., Professor of the Practice of Medicine in the University of Cape Town.

EMMERSON, G. A., M.B. Camb., M.R.C.P. Lond., Hon. Physician to the Royal West Sussex Hospital, Chichester.

FULTON, D. H., M.D. Lond., Pathologist at the Peterborough and District Memorial Hospital.

*GARLAND, T. O., M.B. Camb., D.P.H., Medical Officer of Health for Kettering Rural District Council.

LEYS, D. G., D.M. Oxon., M.R.C.P. Lond., Medical Consultant and Hon. Charge-Physician at the Royal Northern Infirmary, Inverness.

OLDFIELD, JOSIE M., M.R.C.S., Resident Medical Officer at Barking Hospital.

OWEN, J. R., M.B. Camb., M.R.C.P. Lond., Medical Registrar at the St. John Clinic, London.

PRENTICE, DAVID, M.B. Glasg., D.P.M., Resident Medical Officer at the Royal Western Counties for the Mentally Defectives, Starcross, Devon.

SMITH, C. NEWLYN, M.B. Lond., D.O.M.S., Ophthalmic Registrar at University College Hospital, London.

SPILLER, VIOLET, M.D. Geneva, M.R.C.S. Eng., D.P.H., Assistant Medical Officer of Health for Barking.

STEWART, ALICE M., M.B. Camb., M.R.C.P. Lond., Medical Registrar at the Royal Free Hospital.

STRECKER, H. A. J. PULLAR, M.D. Wurzburg, L.R.C.P. Edin., Physician to the British Hospital for Functional Mental and Nervous Disorders, London.

URQUHART, JAMES, M.B. Edin., D.P.H., Assistant Medical Officer of Health for Rotherham.

* Corrected statement. The appointment was incorrectly announced in THE LANCET of Jan. 15th.

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ADDRESSES AND ORIGINAL ARTICLES

VARIATIONS IN SECRETORY ACTIVITY OF HUMAN SWEAT GLANDS

BY YAS KUNO

(From the Institute of Physiology, Imperial University, Kyoto, Japan)

IN 1927 Ikeuchi and I investigated the regional variation of the amount of sweat on twenty different regions of the human body surface. Comparing this regional relationship with the density of distribution of the sweat glands reported in the classical work of Krause (1844), no good correlation could be found between the two. We therefore advanced the following assumptions:—

(1) The distribution of sweat glands over the body surface may vary considerably in different individuals so that it is not correct to compare the regional relationship of the amount of sweat found on one subject with that of the density of sweat glands found on another.

(2) There may be morphologically developed sweat glands that are incapable of secreting.

(3) There may be variations in the secretory activity of sweat glands.

Exact histological observations on the distribution and the volume of the sweat glands were carried out in the anatomical institute of Keio University, Tokyo, on very many corpses of different ages and different races (see Kuno 1934, p. 6). It was found that the number of sweat glands per unit of area of the skin and the regional relationship of their distribution varied considerably in different individuals. The first assumption was therefore verified.

Saito (see Kuno 1934, p. 212) observed the discharge of sweat drops from the pores present on a small field of skin in the palm of the hand by means of a skin microscope.

On repeated observations during sweatings of various intensities, he not only found that there was a considerable variation in the rate of discharge in different sweat pores, but also that there were many pores which never discharged sweat. For example, on an area of the skin of about 5 sq. mm. on the tip of an index-finger, 6 out of the 29 sweat pores were found entirely inactive, 3 never failed to produce sweat in each test, and the others produced sweat from time to time.

This simple investigation seems enough to suggest the truth of the second and third assumptions. Such an investigation can, however, only be made on the palm and the sole, since on the other parts of the skin the sweat pores are very difficult to find. More exhaustive experiments have recently been made by my co-workers on these problems, and we have succeeded in finding some interesting facts on the secretory activity of the sweat glands. Although some experiments are still in progress, in this paper the essential results obtained up to the present will briefly be reported.

ACTIVE AND INACTIVE SWEAT GLANDS

That some of the human sweat glands are entirely inactive in secretion was demonstrated by Ogata (1935) in the following experiments.

On a small field of the skin, it was first determined by investigating sweat drops appearing on the skin how many sweat glands were functioning when the subject was sweating maximally. Then this part of the skin was cut off and the number of glands estimated histologically. In this experiment it was inevitably necessary to observe sweat secretion while sweating was certainly maximal. Any subject perspires more profusely in the summer than in the other seasons, and it is a general feature of sweat secretion that the amount of sweat is small at first and increases with progress of time when the subject is exposed to high temperature. All the experiments were therefore made in the summer; the subject was placed in a hot chamber at dry and wet bulb temperatures of 45° C. (113° F.) and 38° C. respectively, and the investigation of sweat drops was begun after about an hour's stay in this chamber. At that time sweating was so profuse that the sweat flowed down from the legs on to the floor, where it formed pools.

On the skin where the investigation was to be made a pentagonal area of about 0·3 sq. cm. was enclosed in thin lines drawn by tattooing. This area of the skin was covered with cedar oil mixed with coloured wax, and sweat drops, appearing as gleaming white globules beneath the oil, were observed by a skin microscope (Jürgensen's method). These observations were repeated more than ten times a day on the same area of the skin, the general appearance of the sweat drops being sketched each time. After two or three days' repetition, the investigator became so familiar as to remember exactly how many and where sweat drops appeared when sweating was at its greatest. This maximal state was then photographed. After determining the number and the position of all the active sweat glands in this manner, the portion of the skin was cut off and serial sections made, and the number and the position of all the glands were observed histologically.

This was done on a forearm of a Korean, and on the forearm, thigh, and leg of a Japanese (Dr. Ogata himself). In all these four cases the number of the glands found in the microscopic specimens was larger than that of the sweat drops found over the skin—i.e., there were always some glands that were never found to be in action.

Fig. 1 represents one example, in which the investigation was made on an area of the skin of about 40 sq. mm. in extent in the middle of the dorsal antebrachial region. A is a photograph of the sweat drops appearing on this area during the maximal sweating. C is a photograph of the microscopic specimen obtained from a depth of about 0·4 mm. from the surface of this skin area. Its magnification is hardly large enough to show the sweat ducts, and they are therefore schematically shown in B. In A 16 sweat drops are visible, and they correspond with the open circles in B; the 14 solid circles indicate the positions of the sweat ducts that were found in the specimen, but seemed to have never discharged sweat. These latter are perfect in the structure of their walls and possess lumens of ordinary size. The secretory parts of all the sweat glands were also observed, but so far no difference could be detected between the two groups either in the size of the secretory parts as a whole and to the form of the gland-cells. In the positions marked by triangles, in Fig. 1 B, peculiar string-like tissues, resembling the sweat ducts in thickness, position, and form of cells, were found. They had no lumen and became thinner as they passed deeper so that they disappeared gradually. A similar tissue was also found in the specimen obtained from the thigh of the same subject, but not in the others.

From the above results it seems certain that in the human skin there are sweat glands that seem to be fully developed morphologically, but they are never found to be in action in ordinary life. In the human sweat glands may therefore be classified into two groups, the active and the inactive. The ratio of

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active to inactive glands was in the subject of Fig. 1 16 : 14, in the leg and the thigh of the same subject 15 : 8 and 16 : 1 respectively, and in the forearm of the other subject 10 : 2.

DISTRIBUTION OF THE ACTIVE GLANDS

Ogata further investigated the numbers of sweat drops appearing on 27 representative regions on the human body surface, as indicated in Fig. 2, at the state of the maximal sweating above mentioned.

In each region an area of 1 sq. cm. was marked out by a thin circle. In this area ten different fields of 0·06 sq. cm. each were chosen at random by using an ocular millimeter, and the sweat drops present on these fields were calculated. The total number of drops per sq. cm. was reckoned from this. In the observations on the palm and the sole sweating must have been due to mental stress, since none could be elicited there by high temperature. Only on these regions, therefore, was it not certain whether the sweating was maximal. The results in eight healthy men are shown in Fig. 2.

From these observations we may roughly say that the active sweat glands are present most densely on the sole, forehead, and palm, somewhat less on the back of the hand, still less on the lumbar region, the axilla, and the lateral and extensor surfaces of the extremities, and least on the trunk and the flexor and medial surfaces of the extremities.

The average number of the active glands per sq. cm. of the skin, reckoned from the results obtained in the above-mentioned 27 regions, was as shown in Table I, and the total number of the active sweat glands in each subject may be estimated roughly by multiplying this number by the area of his body surface.

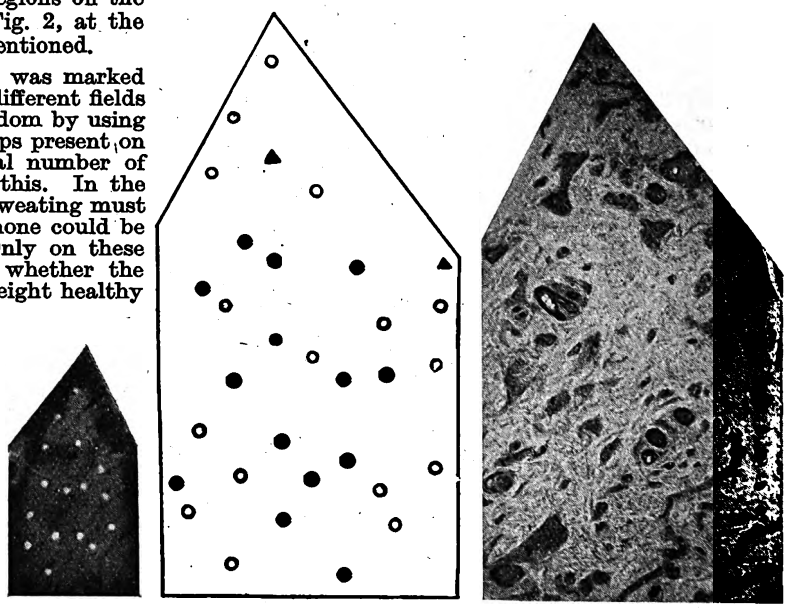

FIG. 1.—Sweat glands in area of skin, 40 sq. mm. in size, from dorsal surface of forearm. (A) Sweat drops showing during maximal sweating; (B) key to photomicrograph (C) of same area of skin, showing position of active (white circles) and inactive glands (black circles). Triangles mark position of peculiar gland-like tissues found also on thigh of same subject, but not in other subjects.

As will be described later on, the total of active glands was again estimated more carefully by Kawabata, and it was found to vary from 2·56 to 3·50 millions, except in infants. (These figures do not correspond with Ogata's since Kawabata excludes the sweat glands on the palms of the hands and the soles of the feet.) The density of distribution of sweat glands has been observed histologically by many anatomists.

TABLE I

Subject.. ..	A	B	C	D	E	F	G	H
Active glands per sq. cm.	134·6	147·5	187·0	169·3	149·0	141·0	153·1	146·5
Total number in body (millions) .	2·06	2·44	3·00	2·65	2·63	2·41	2·47	2·30

According to the results of the investigations which were made on about 15 different regions of the skin of adult Japanese, the average numbers of the sweat ducts per sq. cm. were 143, 212, 244, and 303 respectively in four corpses observed by Taniguchi and Kamiyama (1933), 339 in a girl (Kawai 1933), 208 in a woman (Ito 1934), and 240 in a man (Shibata 1937).

Although the palms and the soles, where the glands are supposed to be present most densely, are omitted from all these observations, the figures are considerably larger compared with the above-mentioned average numbers of the active sweat glands. This is probably so because in the histological observations both inactive and active glands are calculated together. On the other hand, we may notice that individual variations of the results are more considerable in the histological observations. We may therefore consider that the provision of the human body with sweat glands is very great, but variable in different individuals, and that only as many glands as are necessary for life are put into action, while the others remain inactive.

PHYSIOLOGY OF THE GLANDS

It seems to be a general rule in living organisms that their bodies are constructed with elements far more abundant than directly required for life. In some organs, such as the glomeruli of the kidney and the blood capillaries, it has been found that they are acting in parts and in relays, and that the proportion between active and dormant ones may vary from time to time. We may accordingly interpret that most of these elements are active alternately in ordinary life and all together in emergency. On the other hand, it may be assumed that every organ has plenty of reserve strength, but it is not called upon except when urgently needed. The sweat glands seem to be organs suitable for studying these problems, and several experiments have recently been made on the nature of the active and inactive sweat glands.

In the investigation of Saito above cited, it was noticed that some of the glands on the palm of the hand discharged sweat at irregular intervals. They appeared therefore as if they acted not at the same time but in relays. We often had opportunities of observing sweat drops on many different regions of the skin at perspiration of varying intensities. In repeated observations on the same area of the skin, we noticed that, when sweating was moderate, there were glands in which the act of secreting shifted from one to another, while in others it took place almost continuously. But when sweating became profuse

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though not quite extreme both these sets of glands became active. Further increase in the profuseness of sweating was only brought about by an increase in the rate of secretion of each gland and not by a further increase in the number of active sweat glands. This has been confirmed by Ogata (1936) and also by Ichihashi (1936) who photographed sweat drops over the skin. These results indicate that among the active glands there are variations in their activity, and that working in relays is to be found only in some of them. The secretory activity of the sweat glands will be discussed again later on.

In all the experiments described, we have seen that the active sweat glands are distinctly different in function from the inactive ones, and it has been found that in no case have any of the latter become at all active. This point has further been studied by several experiments.

A profuse local sweating was produced by injection of 0·4 c.cm. of 2 per cent. solution of pilocarpine on eight different parts of the skin of two subjects, where the appearance of sweat drops at the maximal sweating due to high temperature had previously been observed (Ogata 1936). It was found that the total number and the position of the drops appearing on each part were exactly the same. It has been proved by many investigators (see Kuno 1934, p. 14, and Wilson 1934) that pilocarpine acts directly on the glands, since secretion can be produced by it after the degeneration of the secretory nerves.

It may therefore be considered that the inactive glands are not only unresponsive to impulses from the sweat centres but also to direct stimulations.

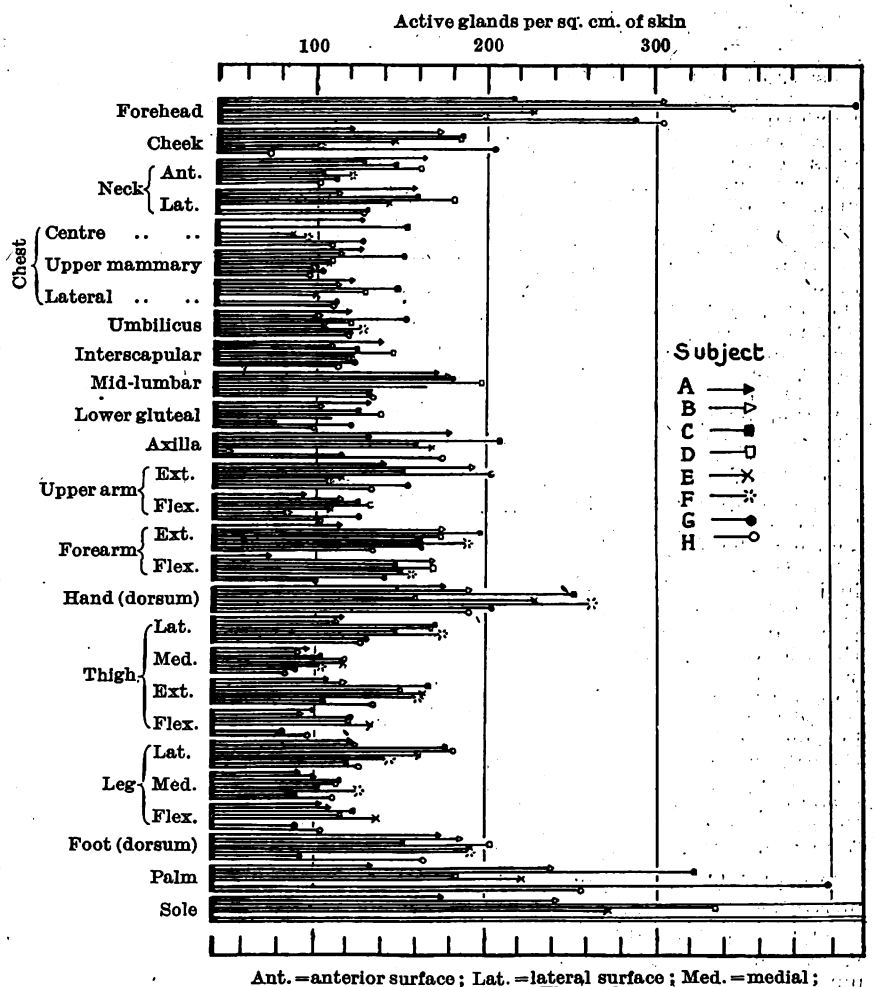
Recently Kosuge (unpublished communication) has examined whether the inactive sweat glands may be activated by repeated stimulations. It had been previously demonstrated by Ito and Adachi (1934) that repeated applications of hot-air bath to any part of the skin increased considerably the activity of the sweat glands on that part—i.e., that part of the skin became capable of producing a much larger amount of sweat than before. This procedure was used by Kosuge. He studied by investigating sweat drops on the skin whether the increase in the amount of sweat was due to the activation of new sweat glands or not.

Many fields of the skin of about 1/25–1/16 sq. cm. each were chosen on the back of the hand and the forearm, and the sweat drops appearing on these fields during the maximal sweating were observed before and after applications of heat. This was made on 5 adult subjects and 3 children in the winter and in the summer. In the winter the effect of the heat applications was considerable, so that after about ten applications the amount of sweat became at least twice as large as before. With such a considerable increase, however, the sweat drops appearing on each field remained exactly the same in number as well as in position.

It was therefore clear that no gland, hitherto not functioning, had been activated by this procedure, and that the increased secretion was due to an increase in the secretory activity of each active sweat gland.

In the experiments made in the summer, the increase in the amount of sweat by the above procedure was less in degree. It was probably so because the sweat glands had already been activated to some extent by the effect of the hot weather. We know from our daily experiences that we perspire much more easily and more strongly in the summer than in the other seasons. We have often had opportunities of confirming this fact by experiment too. For example, in the collection of a large amount of sweat by exposure to a given high temperature, it was found that the same subject required about twice as much time in the winter as in the summer to produce the same amount of sweat. This seasonal variation in sweat secretion is also very probably due to variation in the activity of each active gland.

According to the above results, the active sweat glands seem to be separated strictly from the inactive ones; the former being capable of changing their activity on occasions are responsible for all necessary



Ant. = anterior surface; Lat. = lateral surface; Med. = medial; Ext. = extensor; Flex. = flexor.

FIG. 2.—Distribution of active sweat glands over surface of the body.

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changes in sweating. The latter can hardly be converted into the active ones, at least certainly not by an acute process.

EFFECT OF AGE

Recently Uchino (unpublished communication) has studied the sweat secretion of new-born children and has found that they are not able to sweat at all for several days after birth, but that, this inability being due to the unresponsiveness of the sweat centres, the sweat glands themselves are already capable of secreting when directly stimulated. According to a recent experiment of Kosuge (unpublished), children perspire more readily and more profusely than adults. But one may easily assume that the total amount of sweat produced from the whole body would be less in small children than in adult subjects. It is therefore a question whether all the active sweat glands that would be found in adults are already active, or whether they become so gradually during childhood. Some light may be thrown on this question by investigating the active glands in children.

Number.—The total number was therefore estimated by Kawabata (unpublished) in infants, children, and adult subjects, and the results were compared with each other.

In this experiment the body surface was divided into 22 areas, the dimension of each being directly measured. In each area 3–5 representative fields of the skin, 1/25 sq. cm. each in dimension, were selected, and the number of sweat drops appearing on these fields at the maximal sweating caused by a temperature of 45° C. was calculated by Jürgensen's method. The number of the active sweat glands present in each area was estimated by multiplying the average number of sweat drops on the fields by the dimension of the district, then the total number of active sweat glands of each subject in turn by the addition of those on all the area. This was done in 16 subjects, aged 35 days to 35 years.

The results are shown in Table II. The figures shown as the total number of active sweat glands indicate the numbers on the whole body except the palms of the hands and the soles of the feet, where sweat drops could easily be observed in the adults but with extreme difficulty in small children. For the sake of comparing the results between the two, therefore, the numbers in these regions were excluded from this Table.

From this Table we may notice the following:—

Although individual variations in the total number of active sweat glands are considerable, those found on the 11 subjects aged over 2½ remain within the limits of from 2·29 to 3·12 millions with the single exception of No. 13, in whom it is 2·02 millions.

No relation to the age in this number can be detected. Compared with these figures, those found on the five children under 2 are distinctly small, varying from 1·67 to 2·04 millions. This seems to suggest that, in this stage of childhood, the activation of sweat glands is still taking place.

From the above results and from Uchino's findings we may consider that the great majority of the active sweat glands that would be found in the adult have already been in active condition at birth, but that some further activation takes place until the child is about 2. Although we have no final evidence as yet, it may be possible that the sweat glands which are in action in each subject are the same throughout his life. In the observations of the anatomists already referred to, the average volumes of single sweat glands were measured in different regions of the skin. Although there were considerable regional variations, a general tendency could be noticed that these volumes were small in children and increased according to age. Examples were as follows:—

New-born (Taniguchi 1931)	.. ..	0·0026–0·0046 c.mm.
6½ years (Koibuchi 1932)	.. ..	0·0058–0·0130 „
18 „ (female) (Ito 1934)	.. ..	0·0064–0·0224 „
19 „ (male) (Shibata 1937)	..	0·0093–0·0278 „

The increase in the secretory activity of sweat glands during childhood may partly be due to the increase in their size.

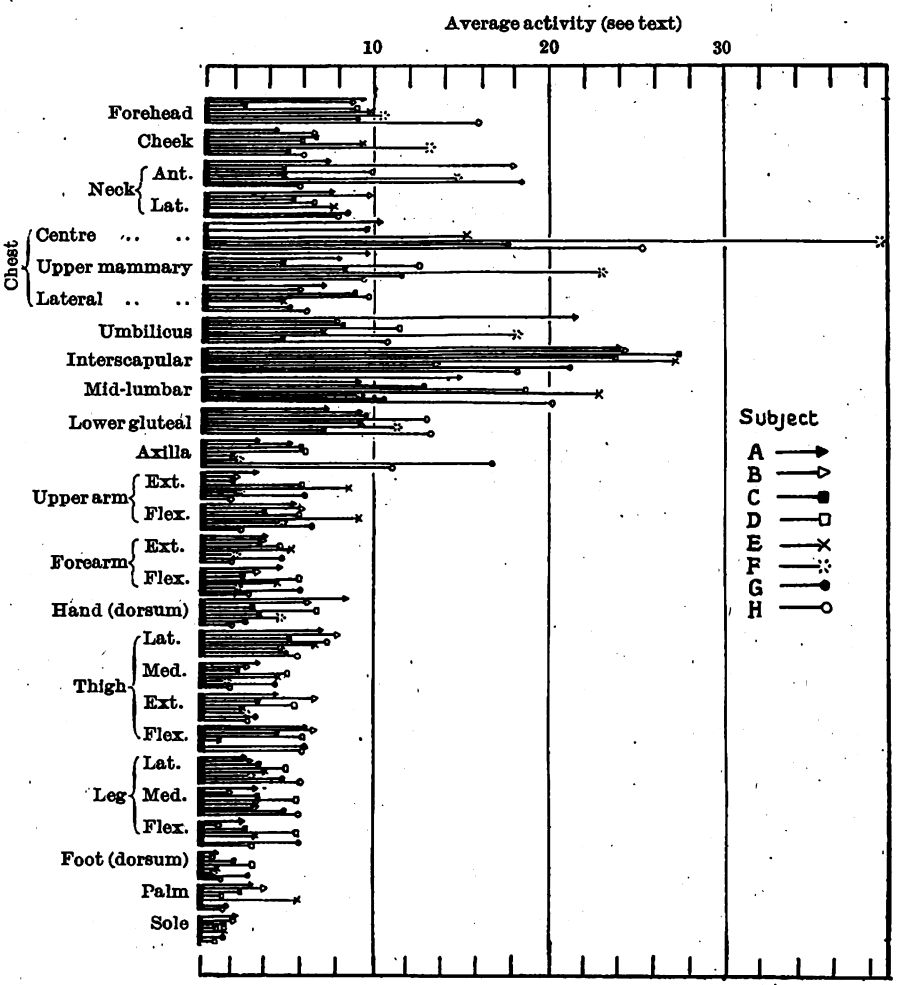

FIG. 3.—Average activity of sweat glands in various regions

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TABLE II—EFFECT OF AGE ON NUMBER OF ACTIVE GLANDS

Subject.	Sex.	Age.	Body surface (sq. m.).	Total No. of active glands (thousands).	Subject.	Sex.	Age.	Body surface (sq. m.).	Total No. of active glands (thousands).
1	M.	35 days.	0·212	1665	9	M.	7 yrs. 2 mths.	0·864	2718
2	F.	9 mths.	0·348	2035	10	F.	10¼ yrs.	1·092	2622
3	F.	1 yr.	0·402	1931	11	F.	17 „	1·420	3124
4	M.	1 yr. 2 mths.	0·411	1833	12	M.	17 „	1·586	2467
5	F.	2 yrs.	0·453	1674	13	M.	20 „	1·530	2017
6	F.	2½ „	0·523	2649	14	M.	26 „	1·405	2319
7	M.	3 „	0·590	3057	15	M.	29 „	1·403	2988
8	F.	6 „ 1 mth.	0·771	2521	16	M.	35 „	1·519	2289

Secretory activity.—According to the above account, the activity of sweat glands seems to increase during childhood. In adults—i.e., after all the sweat glands have fully developed—there is a great variety in the activity of the glands. By a simple investigation of the drops discharged over the skin it may be observed that they vary considerably in size, and by a more careful investigation that the discharge of sweat from each sweat gland takes place periodically, and that the lengths of intervals vary considerably in different sweat glands.

In Ogata's experiment above referred to, he observed sweat drops appearing on the same 27 regions of the skin as mentioned in Fig. 2, and classified them into six groups according to their sizes. Although sweat drops of various sizes were present mixing together on any region, he could notice a tendency that, on each region, the sweat drops of similar size predominated, and that the predominant size varied on different regions of the skin. This at once suggests that there is some regional difference in the secretory activity of the sweat glands. The average activities of the sweat glands on each of the 27 regions of the skin were therefore determined in the following manner:

In the same eight subjects as in Fig. 2 the 27 regions of the skin were covered hermetically with celluloid dishes of about 6 sq. cm. in area, a piece of blotting-paper of the same size being placed in each of them. After the subjects had perspired profusely in a hot chamber, all the dishes were stripped off, care being taken to absorb all the sweat beneath the dishes by the blotting-papers. The amount of sweat was determined by weighing each paper together with the dish. In each experiment the amount of sweat obtained from each part of the skin was converted into a percentage of the sum of the amounts of sweat obtained from all the parts used in that experiment. These percentages of each subject were divided by the numbers of active sweat glands found on the corresponding regions of that subject (Fig. 2). The quotients indicate the average activities of the sweat glands on each region. They are shown in Fig. 3.

Although there are no little individual variations in these results, the following can be regarded as the general tendency. The sweat glands on the central zones of the ventral and dorsal surfaces of the trunk are most active, those on the other parts of the trunk, on the neck, and on the face somewhat less, those on the extremities still less, and those on the foot and on the palm of the hand least active. Considerable regional variations with regard to the average volumes of the sweat glands were found in the anatomical observations above cited. In the three observations of Kawai, of Ito, and of Shibata, which were performed on adult subjects, it was consistently found that the sweat glands on the chest were very large and that those on the back and the abdominal region were relatively large. But comparing their results with those shown in Fig. 3, no good correlation between the sizes of the glands and their activities could be found.

As already described, the activity of each sweat gland can be considerably augmented by repeated applications of heat. The increased sweat secretion that we are accustomed to experience during the summer is evidently due to a similar increase in the activity of the glands resulting from the effect of high atmospheric temperature. The active sweat glands can therefore change their activity temporarily on occasions, perhaps even by some other causes than heat.

SUMMARY

In the human body there are a large number of sweat glands that are entirely incapable of secreting. Accordingly the sweat glands may be classified into active and inactive types.

The inactive sweat glands will not secrete either in high temperatures or with pilocarpine. Repeated applications of heat do not activate them.

The distribution of the active sweat glands over the body surface was investigated, and their total number was estimated. The latter varied from about 2·0 to 3·5 millions. Most of them are already active at birth, but the total number is somewhat less in children under 2.

The secretory activity of the glands seems to increase during childhood. In adults there are considerable variations of sweat glands with regard to secretory activity. Some regional variation can also be noticed. Repeated applications of heat temporarily increase their activity.

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CHADWICK PUBLIC LECTURE.—On Feb. 15th, at 5.15 P.M., Major P. Blair-Hook of the South Africa Medical Corps will deliver the fourth lecture of the Silver Jubilee course given by representatives of the Dominions. He will speak on health conditions in the Union of South Africa. Other fixtures include Mr. B. S. Townroe on the hygiene of prisons (March 3rd), and Mr. W. J. E. Binnie on water-supply in relation to public health (March 24th). The first and the last lecture will be given at 26, Portland-place, London, W., and the second at the London School of Hygiene, Keppel-street, W.C. Further information may be had from the secretary of the trust, 204, Abbey House, Westminster.

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STREPTOCOCCAL MENINGITIS

SULPHANILAMIDE IN ITS MANAGEMENT

By Terence Cawthorne, F.R.C.S. Eng.

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THERE have been few more fatal diseases than streptococcal meningitis. Until the discovery of the sulphanilamide group of drugs the mortality-rate of published cases lay in the region of 97 per cent. A survey of the reports from 1900–34 by Gray (1935) revealed 44 recoveries from meningitis in which streptococci had been demonstrated in the cerebro-spinal fluid. During the past eighteen months since sulphanilamide has been used, I have noted reports of 40 recoveries from streptococcal meningitis.

In order that this powerful new drug shall be used to the best advantage a knowledge of the way in which streptococcal infection may spread to the meninges, together with an appreciation of the working of the cerebro-spinal system, is essential. The impression gained from reading case reports is that these important factors are not always fully understood, and in consequence there seem to be no fundamental principles for the management of streptococcal meningitis. The purpose of this article is to describe the disease in its varying phases and to discuss the different forms of treatment.

Ætiology

The incidence of streptococcal meningitis is not easy to determine from the available published work, but it probably lies in the region of 6 per cent. of all cases of meningitis (Williams and Gosling 1932). In an analysis of 623 cases of meningitis due to organisms other than the meningococcus and tubercle bacillus, Neal and others (1934) found the incidence as follows :—

Pneumococcus	214
Streptococcus	205
Influenza bacillus	118
Staphylococcus..	30
Others and mixed	56
	623

The same authors found that a hæmolytic streptococcus was the responsible organism in 96 per cent. of the streptococcal cases. The primary focus was found to be in the ear or nose in 70 per cent. of the cases in which the cause could be traced.

In a study of suppurative meningitis in general secondary to disease of the ear, nose, and throat, Eggston (1934) found the following frequency of route of infection :—

Auditory apparatus	90
Paranasal sinuses	18
Cavernous sinus	8
Post-operative	8
Miscellaneous	3
	127

It is evident, therefore, that the infection usually spreads to the meninges from the ear, and to a lesser extent from the nose. Injury and respiratory affections play a relatively minor part in the cause.

Pathology

Infection may reach the meninges via the blood stream, by neighbouring bone disease, or through natural spaces or gaps as a result of injury (Turner and Reynolds 1931). The clinical course and treatment of the disease are so dependent upon the method of spread that it will be well worth while considering these different routes in further detail.

HÆMATOGENOUS

Venous.—The numerous veins connecting the meninges with the middle-ear cleft, nose, and paranasal cavities may frequently be involved in infections of these spaces. The damaged endothelium of an infected vein wall should cause a thrombosis that acts as a protective barrier in most cases. In the presence of an exceptionally virulent infection, poor resistance, or local trauma, this protective barrier may prove inadequate and the infection will then spread to the meninges. This is the probable route in many of the fulminating cases of meningitis that follow rapidly on the heels of an acute aural or nasal infection. Certainly it is the most likely cause when meningitis follows extensive operative procedures undertaken in the earliest stages of an acute streptococcal infection, before protective barriers have been set up.

Embolic.—When streptococcal meningitis occurs in the course of a chest infection, it is possible that the infection reaches the meninges by means of emboli. One cannot say how frequently this route is responsible, because in so many acute chest diseases there is coexistent infection in the nose or ear.

OSSEOUS

Ear.—The petrous and mastoid portions of the temporal bone enclose the middle-ear cleft and labyrinth, and may be honeycombed by air-celis down to the very tip of the petrous bone. These cells are in more or less direct communication with the middle-ear cleft. This bone reaches to the centre of the skull and its upper and posterior surfaces are only separated from the main cisternal lakes of the subarachnoid space by a layer of dura mater. Disease of the middle-ear cleft, if unhealed, may involve the bony boundaries which separate it from the cranial cavity, and thus eventually spread to the dura mater covering the petrous bone. This in its turn may, if the diseased bone is not removed and adequate drainage provided, spread to the subarachnoid system. Such a process is usually relatively slow, and results not so much from over-zealous as from inadequate surgery.

Nose.—With the exception of the maxillary antrum, the paranasal sinuses are separated from the intracranial cavity only by thin plates of bone. Fortunately these bony walls are remarkably resistant to infection, and it is as a rule only in long-standing cases that the walls are eroded by disease. Even then the dura may be sufficiently resistant to further spread of the disease except when there is a superadded acute infective process combined with inadequate drainage. The frontal sinus is the most frequently recognised offender, but recently the sphenoidal sinus (Eagleton 1932) has been described as a likely route in some of the otherwise unexplained cases of meningeal infection.

Infection by the osseous route is gradual and should give warning signs of its onset. In contradistinction to the hæmatogenous route in which the disease spreads like a fog insidiously pervading the rooms of a house, osseous infection knocks at the front door for some time before attempting to enter.

DIRECT SPREAD

Preformed spaces.—There are natural communications between the subarachnoid space and the ear via the labyrinth by means of the sheath of the 8th nerve, the ductus endolymphaticus, and the cochlear aqueduct. In some cases, usually children, there may be a persistence of the suture between the petrous and squamous portions of the temporal bone which, when present, runs across the middle-ear cleft. Infection may spread spontaneously by means of these spaces, but it is felt

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that such spread is more probable after extensive premature surgery. In the nose, prolongations of the subarachnoid space extend along the branches of the olfactory nerve. Again, spontaneous spread is occasionally seen in an acute nasal infection, but surgical or other trauma to the olfactory area is a much more likely cause.

Trauma.—Direct operative trauma involving preformed spaces or breaking-down of natural protective barriers encourage the spread of infection to the meninges. Accidental operative trauma in the course of any operation on the skull, especially nasal or ear, accounts for a certain number of cases. Fracture of the skull which exposes the subarachnoid space sometimes causes meningitis, especially if the ear or nasal cavities are involved and there is a pre-existing aural or nasal infection. Prolonged nasal packing, particularly if in the upper part of the nasal cavity, may favour the spread of infection to the meninges.

Clinical Features

Three distinct stages of this disease may be recognised—the stages of onset, of the established disease, and finally of paralysis. The speed with which these succeed one another depends largely upon the route which the infection takes. Naturally the virulence of the infection, the resistance of the patient, and the management of the case play important parts in the course of the disease, but their chief influence is upon the route that the disease chooses.

STAGE OF ONSET

Headache is the earliest and most constant sign of meningeal involvement. Localised pain suggests local infection, but a general invasion of the meninges causes a generalised and very severe headache.

Vomiting is a frequent early symptom. Like the vomiting of other central nervous affections it is unaccompanied by nausea and is not associated with meals.

Photophobia may or may not be severe in the early stages. Dislike of strong light may be noted at the onset, but it is by no means as obvious or constant as in the later stages.

Fever.—A rigor or convulsion may mark the onset and usually reveals a high temperature. This is less likely to show diurnal variations characteristic of most infections.

Mentality.—This is a stage of increased mental activity which may show itself as a feeling of well-being or apprehension.

Reflexes are usually increased, especially the tendon reflexes.

Neck.—Stiffness of the neck and disinclination to flexion are early and valuable signs of meningeal involvement.

STAGE OF THE ESTABLISHED DISEASE

All the previous symptoms are more severe, especially the headache and photophobia. The mentality may not be so bright, although the patient may exhibit a considerable amount of mental activity. This gradually tends towards apprehension and intolerance towards interference. The neck stiffness becomes worse and there may even be neck rigidity. The abdominal reflexes are diminished or possibly absent, but the tendon reflexes are usually present although possibly a little less brisk than in the stage of onset.

Kernig's and Brudzinski's signs may be positive, but are chiefly of value as confirmatory tests. The temperature continues to keep high and absence of diurnal variations is usually noted.

STAGE OF PARALYSIS

There is more intolerance towards all forms of external stimuli and a busy and often noisy delirium supervenes. From this delirious state the patient gradually sinks into unconsciousness that is usually profound towards the end. Neck rigidity is extreme and may result in head retraction, especially in children.

By this time the abdominal reflexes will have disappeared and tendon reflexes will either be very diminished or absent. The temperature continues high, with little or no remission, and in the terminal stage may rise very high. Cranial nerve palsies appear and are most noticeable in those supplying the eye muscles. Incontinence, especially in adults, is a serious sign that is seen in the latest stages of the disease. Delirium passing into coma, cranial nerve palsies, absent reflexes, and incontinence characterise this terminal stage, and are the result of increasing intracranial pressure combined with the toxic effects produced by the disease on the central nervous system.

Diagnosis

The clinical features of streptococcal meningitis do not distinguish it from other forms of meningitis, except that fulminating cases in which the disease progresses with startling rapidity are possibly more common. Therefore the only certain way of determining the true state of affairs is by an examination of the cerebro-spinal fluid. It has been said that lumbar punctures may favour the dissemination of the disease by aspirating, so to speak, infection from the primary focus into the subarachnoid system. This seems to be merely a theoretical objection, and the possible dangers are more than compensated for by the valuable information that an examination of the cerebro-spinal fluid afford (Kolmer 1932). The cautious withdrawal of a few c.cm. of cerebro-spinal fluid should always be undertaken in a suspected case of meningitis. The findings will depend upon the stage of the disease, and may be divided into serous, cellular, and bacterial. These divisions roughly correspond to the clinical stages, but are somewhat in advance of them.

Serous.—The earliest reaction of the cerebro-spinal system to a streptococcal infection is an outpouring of fluid. This causes a rise in the cerebro-spinal fluid pressure above the normal 120 mm. of water. At this stage there may be no increase in the cellular content, and sugar, chloride, and protein will be present in normal quantities. Kopetsky (1935) has shown that at this stage the raised intracranial pressure leads to deficient oxygenation. This causes an increase in the lactic acid content which utilises the available carbonates, causing a reduction of the CO_2 content and a lowering of the *p*H. These delicate and early tests are not, however, in general use. Early lumbar puncture in a case showing signs of meningeal irritation, especially when there is an active primary focus, would do much to establish an early diagnosis so that appropriate treatment could be instituted before the disease has got too firm a hold on the central nervous system. Certainly a case showing these altered chemical changes as a result of increased intracranial pressure urgently calls for withdrawal of excess cerebro-spinal fluid so as to bring the pressure within normal limits.

Cellular.—In the next stage, sometimes called the stage of meningeal reaction, there is an increase in the cellular content of the cerebro-spinal fluid. The normal fluid should not contain more than 5 lymphocytes per c.mm., but in a streptococcal infection there may be as many as 10,000 cells, all polymorphonuclear. In some instances a proportion of the cells may be lymphocytes, and in my experience this has been found in the less acute cases due to infection by the osseous route, and is a favourable sign. There is a considerable increase in the protein content, the chlorides are usually reduced, while the sugar may or may not be reduced.

Bacterial.—The discovery of bacteria establishes the exact diagnosis. It indicates an advanced stage

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of the disease and has always been considered to be of serious prognostic significance. It is unfortunate that so many reported cases of recovery from bacterial meningitis have failed to reveal an organism. They may have been considered to be streptococcal because the organism of the primary focus was a streptococcus, but from the point of view of records, no case of meningitis should be considered as due to any particular organism unless that organism can be clearly demonstrated in the cerebro-spinal fluid. The protein will continue to be high, the chlorides reduced, and in this phase the sugar will be very diminished or absent. The presence of sugar at this stage, or its reappearance during the course of the treatment, is said to be a favourable prognostic sign. In the most desperate cases the fluid may be teeming with organisms but show very few cells. Another aspect is that it seems to be a frequently accepted principle that cellular meningitis without organisms is a meningococcal infection. This is often so, and has led to a presumptive diagnosis of meningococcal meningitis without, unfortunately, any search being made for a primary focus. It would be far wiser not to presume a case of cellular meningitis is due to the meningococcus until all possible primary foci of infection have been eliminated. This applies especially to the ear and nose. Streptococci may be present on a stained film, or on culture, or both. When seen on a film only, this indicates an organism weakened by the natural defences of the body and is a favourable sign. In this connexion it is worth while noting that a weakened or dead organism may lose its staining properties, and a Gram-positive coccus may become Gram-negative. This probably accounts for some of the cases of mixed infection that are reported, and may result in some streptococcal cases being labelled as meningococcal. When the streptococcus can be grown on culture, the disease has reached an advanced stage and until the discovery of sulphanilamide the prognosis was considered to be wellnigh hopeless.

These three phases of the fluid, like the clinical course, may follow one another with such rapidity that an opportunity does not arise to examine the cerebro-spinal fluid until the bacterial phase. It may be that the natural defences of the body or appropriate treatment are able to arrest the progress of the disease, so that the final bacterial stage is never reached. This is all to the good, and it cannot be urged too strongly that the cerebro-spinal fluid should be examined in all cases with suspicious symptoms, especially if there is an obvious primary focus, so that early treatment can be instituted.

Prophylaxis

Prevention is so much easier than cure in meningitis so it will not be out of place to mention some of the more important preventive points, even at the risk of repetition.

Extensive surgical procedures in the early stages of any acute streptococcal infection, before protective barriers have been set up, favour the dissemination of the infection. This applies particularly to suppurative processes near the meninges. In the middle-ear cleft nothing more than paracentesis should be attempted in the early stages, unless it is reasonably certain that there is extensive bony involvement. Such involvement is rare in the first few days, and even in the presence of signs of meningeal invasion further surgery may do more harm than good. Certainly spread by vascular and preformed spaces is likely to be hastened rather than checked. These remarks do not, of course, apply when an acute infection supervenes upon a long-standing chronic disease, where there may already be bony involvement.

In the nose, even more than the ear, surgery in acute infection should be limited to the simplest drainage of pus under pressure in soft tissues, or gentle lavage of an infected sinus. Operations involving the bony walls of the sinuses, and especially when near the diploe of the skull, should be avoided at all costs (Cawthorne 1935).

Streptococcal infections of the face and scalp should be treated with great respect and surgical measures should only be employed when there is pus under tension.

Fractures of the skull involving the subarachnoid space call for careful cleansing and then strict exclusion of outside infection as far as possible. Routine operations on the head, nose, and throat should be avoided in the presence of any acute infection, and of course in no circumstances should high nasal packing be left in place more than, at the most, thirty-six hours.

In all cases where the spread of a streptococcal infection to the meninges is a possibility, it will be wise to give a course of sulphanilamide.

Treatment

The management of streptococcal meningitis calls for the neutralising of the infection, the avoidance of excessive intracranial pressure and, when possible, for the eradication of the primary focus of infection. Many remedies have been suggested and tried to meet these requirements, and it is beyond the scope of this article to discuss all the methods of treatment that have been employed, although I would like to acknowledge with gratitude the original inspiration I received from helping Jenkins in this country, and from the writings of Logan Turner and Reynolds, Neumann, Eagleton, Kopetsky, Dwyer, Neal et al., and Gastoin, and the reports of cases successful and otherwise that are available.

The different aspects of the treatment will be considered separately.

ANTISERUM

Apart from scarlet fever cases in which anti-scarlatinal serum may be used, there is but little evidence to show that antiserum is of any great help, though it has been used extensively. It may be given directly into the theca, but it appears to be just as effective intravenously or intramuscularly, and any additional irritation of the cerebro-spinal system is avoided.

BLOOD TRANSFUSION

Repeated small transfusions have been used a great deal, especially in America. It would seem that their greatest use is when there is a coexistent septicæmia and deficient blood count. A good leucocytosis and normal red count make transfusions unnecessary; in fact, they may in such circumstances do as much harm as good.

CHEMOTHERAPY

Since the introduction of sulphanilamide other chemical agents have fallen into disuse. Formerly acriflavine, Mercurochrome, gentian-violet, and other agents were employed either intrathecally, intravenously, or even by intracarotid injection. It may well be that such drugs do more harm by irritating than good by neutralising. Sulphanilamide, on the other hand, seems to have entirely altered the outlook of the disease. Of the 3 cases of streptococcal meningitis under my care this year, 2 are alive and well. They were secondary to middle-ear infection. The third (fatal) case, although an acute ear infection was present, was shown post mortem

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to have been infected via the sphenoidal sinus. All three had sulphanilamide. Previous to this, and before sulphanilamide had been used, 8 cases had all been fatal. Trachsler and others (1937) in a study of 28 patients with this disease found that previous to using sulphanilamide there was only 1 recovery out of 21, whilst since its use there have been 4 recoveries in 7 cases. It is very important to realise that the drug acts not so much by destroying the disease and its primary focus as by neutralising the circulating toxins and bacteria. Thus the natural defences of the body are able to concentrate on resisting further infection.

In a desperate disease such as streptococcal meningitis large doses must be given. A suggested maximum dosage is 1 gramme per 20 lb. of body-weight in the twenty-four hours. When possible this should be given by mouth, but in young children and delirious patients it is best given subcutaneously as an 0·8 per cent. solution in normal saline. A full twenty-four hours' dose may be given at the onset. Thereafter divided doses every six hours by mouth, or if parenterally, every twelve hours. It is doubtful whether any advantage is to be gained by giving the 0·8 per cent. solution intrathecally, as the drug quickly finds its way into the cerebro-spinal fluid when given by the mouth or parenterally. With large doses like these, a careful watch must be kept for complications, and regular blood examinations should be made to ensure that the hæmopoietic system is unaffected (Schwentker 1937).

DRAINAGE OF CEREBRO-SPINAL FLUID

Avoidance of intracranial pressure is important and can usually be effected by repeated lumbar or cisternal punctures. Numerous methods for the drainage of excess cerebro-spinal fluid have been employed, but the general consensus of opinion is that regular lumbar punctures give the best results. Washing through the meninges from lumbar region to focus of infection with Ringer-Lock's solution has produced good results (Jenkins 1929) so long as there is no block, but this method could undoubtedly remove the protective antibodies from the cerebro-spinal fluid and cannot be recommended. Kubie (1933) has advocated forced spinal drainage. He finds that with an open cerebro-spinal system intravenous hypotonic saline solution reverses the flow of cerebro-spinal fluid and then there is an outpouring of fluid from the perivascular system which flushes out septic matter and at the same time contains antibodies. The excess is drained away by means of an indwelling lumbar puncture needle. Reports of this method have been conflicting, and I have employed it in four cases, three of which I drained via the labyrinth. Three of the patients died, while the fourth, a case of pneumococcal meningitis secondary to chronic suppurative otitis media, is still under treatment. Even so, it may prove helpful, especially when there is a high cellular count and the cerebro-spinal fluid is thick and does not flow easily.

Local drainage of a cistern by incision of the dura covering the posterior aspect of the petrous bone is a convenient way of drainage where a primary ear focus has been eradicated. This incision is justified only when organisms are present in the cerebro-spinal fluid and a similar organism is found in the infected mastoid. Recently Ferris Smith (1936) has suggested drainage of the main basal cistern in cases secondary to sphenoidal sinus suppuration by drilling a hole through the basisphenoid.

ERADICATION OF THE PRIMARY FOCUS

When there is clearly a primary focus the decision as to whether or no an attempt to eradicate it should be made may be very difficult. Certain general rules may be laid down for guidance, but of course no two cases are quite alike and it is impossible to suggest rules that will be suitable for every case. When the infection has spread to the meninges by the vascular route, or by preformed spaces, the course of the disease is usually rapid. One day there is slight headache with an acute ear or sinus infection. The next day the patient is delirious with all the signs of advanced meningitis. In these fulminating cases surgery should be limited to simple drainage only. Opening-up of tissue spaces and removal of bony barriers may only favour dissemination of the infection. It is far better to rely on other measures and to leave eradication of the primary focus until the resistance of the patient has been built up. The value of this line of treatment was not fully appreciated until the advent of sulphanilamide.

When the infection has spread by bone disease to the adjacent dura, the clinical course is slower. There is a history of suppuration for some time and possibly there has already been a mastoid or sinus operation. Here the early eradication of the infecting bone is of grave importance. It is no use here to rely on conservative measures that may tackle the disseminated disease but cannot prevent further reinfection from the untreated diseased bone. This point is being stressed because there may be a tendency to use sulphanilamide as a substitute for surgery in these osseous cases, which it is not. It may be repeated here for the sake of emphasis that an acute infection may mask long-standing chronic disease with extensive but unexpected bone destruction. Such cases may be difficult to diagnose, and may require a very nice judgment because they urgently call for extensive operation—treatment by conservative means would be of no avail.

Traumatic infections call for conservative treatment, free drainage of the route of infection, and prevention of secondary infection.

In addition to the treatment already outlined, the general care of the meningitis case calls for constant attention and careful nursing. Absolute quiet, copious fluids, and good elimination are of course essentials. During the recovery stage a careful watch must be kept for a possible relapse, and treatment should be continued for at least two weeks after everything appears normal.

Summary

1. Streptococcal meningitis usually spreads from a primary focus in the ear or nose.

2. The method of spread in very acute cases is usually by means of blood-vessels, or by preformed or traumatic spaces. In less acute cases, diseased bone in contact with the meninges will be the cause. An appreciation of these different pathways of infection is an important factor in deciding the correct line of treatment to adopt.

3. The clinical features are described in three stages which follow the cerebro-spinal fluid changes. The speed with which these stages follow one another depends largely upon the route taken by the disease.

4. The importance of early diagnosis by examination of the cerebro-spinal fluid is stressed, and it is shown that this far outweighs the theoretical danger of dissemination of the disease by the cautious withdrawal of a few c.cm. of cerebro-spinal fluid for examination.

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5. Treatment is described under the headings of neutralising the infection, drainage of excess cerebrospinal fluid, and eradication, as far as possible, of the primary focus.

6. It is shown that the marked improvement in the recovery-rate coincides with the use of sulphanilamide.

7. Although sulphanilamide is undoubtedly the most potent agent available in the treatment of streptococcal meningitis, it is very strongly urged that it should not be used as a substitute for surgery in appropriate cases.

8. The decision whether eradication of the primary focus is required in addition to sulphanilamide and spinal drainage is made easier by a knowledge of the way in which the disease has spread from the primary focus.

9. Extensive surgical procedures in the very acute fulminating cases may do more harm than good.

10. Whatever treatment is adopted, its chance of success will be increased if it is instituted early, before the disease has had time to overwhelm that most important factor, the natural defences of the body.

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VITAMIN C IN HEART FAILURE

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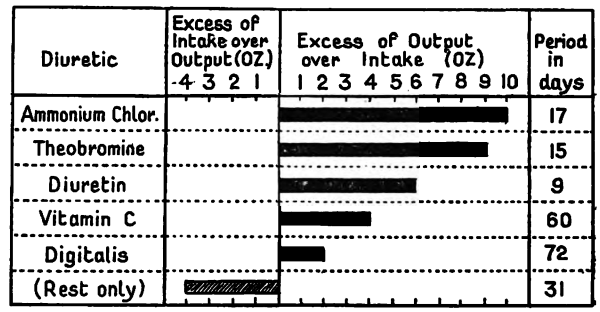
DURING his investigation on the excretion of vitamin C in man, Abbasy[1] observed that the volume of urine increased significantly after the administration of a test dose of ascorbic acid. In a series of children suffering or convalescing from rheumatism as well as in control cases he found that vitamin C—prescribed as Redoxon (Roche) tablets—produced a small diuretic effect as soon as the body had reached a state of saturation for the vitamin. The results obtained led him to suggest that vitamin C might prove valuable in those cases needing slow and progressive dehydration of the body, and particularly if infection was an added feature.

Any preparation capable of inducing diuresis in subjects that show neither œdema nor any manifestations of fluid retention, might be expected to produce a greater diuretic effect in those presenting anasarca from heart failure. I decided, therefore, to submit vitamin C to a controlled clinical trial in patients with heart failure, and 9 were selected.

THE EXPERIMENT

Four of the patients had failure with normal cardiac rhythm, and another 4 failure with irregular rhythm due to auricular fibrillation, while the remaining patient had conspicuous œdema of unknown ætiology.

Each patient remained in bed under standard hospital conditions during and for some days preceding the period of observation, and received a light solid diet. A constant fluid intake was prescribed and the urine was measured, while the quantity of both fluid intake and urinary output was recorded in ounces for each 24 hours commencing at 8 A.M. Laboratory tests liable to disturb these values were omitted during the period of clinical trial, purgatives were never used, and care was taken to exclude other factors which might influence the urinary output; the diuretic effect of the initial resting period and diminished fluid intake was specially kept in mind so that stabilised intake and output values were reached before each trial period began.



Average daily excess of urinary output over fluid intake in 9 patients with anasarca when treated with vitamin C and 4 reputable diuretics during a total period of 173 days. This is compared with the adverse fluid balance present when no medicine was given.

Apart from determining the presence and extent of vitamin-C diuresis, it was compared in each patient with that produced by established diuretics. Thus if vitamin C was found to increase the urinary output consistently and to a degree comparable to that effected by digitalis, ammonium chloride, and theobromine, it would thereby establish a claim as a reputable diuretic in the treatment of anasarca from heart failure. As dehydration progressed in each patient following the use of successive diuretics the urinary volume was expected to diminish and this consideration was taken into account when the diuretic property of each preparation was evaluated.

In the present investigation vitamin C was dispensed as redoxon tablets and the urinary output was recorded without attempting to estimate its ascorbic acid content or to determine the stage at which the saturation point for vitamin C was reached.

The results are summarised under each case and are prefaced by a description of the diagnosis without including details of the physical findings expressing the extent of heart failure present at different stages during the investigation. The diuresis induced in each patient by vitamin C and other preparations is expressed quantitatively in the Table.

RESULTS

CASE 1.—Female aged 66. Heart failure with normal heart rhythm; hyperpiesia (blood pressure 210/105 mm. Hg). Vitamin C (3 tablets of redoxon daily) induced efficient diuresis comparable to that produced by ammonium chloride.

CASE 2.—Male aged 51. Heart failure with auricular fibrillation; mitral stenosis; constrictive pericarditis; calcification of pericardium. Vitamin C (6 tablets of redoxon daily) increased the urinary output more than digitalis but less than ammonium chloride.

[1] Abbasy, M. A., *Biochem. J.* 1937, **31**, 339.

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FLUID INTAKE AND URINARY OUTPUT WITH VITAMIN C AND KNOWN DIURETICS

Case.	Medicine used and its daily dose.	Observation period (days).	Average daily— Fluid intake in oz.	Average daily— Urinary output in oz.
1	Placebo.	4	29	30
	Redoxon (3 tabs.).	5	29	40
	Ammonium chloride (gr. 60).	8	30	41
2	Placebo.	5	30	24
	Nativelle's digitalin (gr. 1/80).	6	30	23
	Redoxon (6 tabs.).	6	30	28
	Ammonium chloride (gr. 60).	6	30	39
	Novurit (2 c.cm.) intraven.	2	30	60
	Novurit and redoxon.	3	30	69
	Salyrgan (2 c.cm. intraven.).	6	30	83
	Salyrgan and redoxon.	7	30	88
3	Placebo.	7	30	27
	Theobromine (gr. 10).	10	30	48
	Digitalis folia (gr. 3).	7	30	31
	Theobromine.	5	30	22
	Redoxon (3 tabs.).	7	30	30
	Digitalis.	6	30	18
	Redoxon.	8	30	26
	Digitalis.	9	30	24
4	Placebo.	5	47	40
	Digitalis folia (gr. 6).	10	32	45
	Redoxon (6 tabs.).	7	39	56
	Redoxon and digitalis.	4	38	55
5	Placebo.	6	30	29
	Redoxon (6 tabs.).	6	30	35
	Digitalis (gr. 6).	6	30	32
6	Salyrgan (2 c.cm. intraven. alternate days).	6	40	54
	Salyrgan and digitalis folia (gr. 3).	6	26	69
	Salyrgan and ammonium chloride (gr. 90).	6	20	72
	Salyrgan and redoxon (3 tabs.).	4	20	45
	Salyrgan and digitalis.	6	22	38
7	Nativelle's digitalin (gr. 1/120).	5	39	36
	Digitalis and redoxon (6 tabs.).	6	40	49
	Digitalis and novurit (2 c.cm. intraven.).	5	40	49
	Digitalis and redoxon.	6	40	34
	Digitalis and ammonium chloride (gr. 30).	3	40	51
	Digitalis and pineapple juice (½ pint).	16	40	36
8	Redoxon (6 tabs.).	10	36	40
	Diuretin (gr. 30).	9	39	45
	Digitalis folia (gr. 3).	5	38	40
	Digitalis folia (gr. 2).	4	39	34
9	Placebo.	4	28	17
	Digitalis folia (gr. 6).	9	28	44
	Redoxon (6 tabs.).	6	29	40
	Digitalis.	5	29	36

CASE 3.—Female aged 33. Heart failure with auricular fibrillation; tricuspid stenosis; mitral stenosis. Vitamin C (3 tablets of redoxon daily) increased the urinary output more than digitalis. It proved less efficient than theobromine during one observation period and more efficient during a further period of observation.

CASE 4.—Male aged 31. Heart failure with normal heart rhythm; subacute bacteriæmic endocarditis; aortic stenosis. Vitamin C (6 tablets of redoxon daily) induced diuresis in excess of that obtained from the use of digitalis.

CASE 5.—Female aged 54. Œdema of the extremities of unknown ætiology. Vitamin C (6 tablets of redoxon daily) induced diuresis superior to that which followed digitalis.

CASE 6.—Female aged 68. Heart failure with auricular fibrillation; mitral stenosis. Vitamin C (3 tablets of redoxon daily) accentuated the diuresis produced by Salyrgan, but to a lesser degree than ammonium chloride although greater than digitalis.

CASE 7.—Female aged 42. Heart failure with auricular fibrillation; mitral stenosis. Vitamin C (6 tablets of redoxon daily) increased the diuresis induced by digitalis during one trial period but not on another occasion when the observation was repeated.

CASE 8.—Male aged 41. Heart failure with normal heart rhythm; mitral stenosis; emphysema. Vitamin C (6 tablets of redoxon daily) produced diuresis greater than that obtained from the use of digitalis but not so great as that induced by diuretin.

CASE 9.—Male aged 63. Heart failure with normal heart rhythm; cardiac infarction; hyperpiesia. Vitamin C (6 tablets of redoxon daily) induced diuresis comparable to that produced by digitalis.

DISCUSSION AND SUMMARY

Vitamin C, dispensed as redoxon tablets, increased the urinary output in each of 8 patients with heart failure and in another with considerable œdema of the lower extremities of unknown ætiology. In 2 patients the increase was slight, in 4 it was either moderate or considerable, and in 3 cases it was great.

When compared with recognised diuretics, vitamin C was found to be as efficient as ammonium chloride in producing diuresis during one observation period but less efficient during two other periods. It was more efficient than theobromine during one trial period and less during another. In one patient it was less efficient than diuretin. It proved to be as efficient as digitalis in increasing the urinary output during one period of observation and more efficient during six others.

When a quantitative estimate was made of the excess of urinary output over fluid intake in the 9 patients over a period of 173 days, it was found that vitamin C induced greater diuresis than digitalis but less than theobromine, diuretin, and ammonium chloride (see Chart). In each of 3 patients where heart failure had occurred with auricular fibrillation, vitamin C induced diuresis actually in excess of that produced by digitalis although never with the same degree of clinical improvement nor with reduction of the ventricular rate.

These results, apportioning to vitamin C a diuretic property, direct attention to the need of providing an adequate supply of vitamin C for all patients with heart failure. In order to ensure a constant state of vitamin C saturation in heart failure it is probably enough, if redoxon is not administered, to include in the patient's diminished fluid intake an adequate proportion of lemon and orange juice.

This investigation was conducted during the tenure of a grant from the Medical Research Council.

A BOY WITH NO FIBRINOGEN

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A LIABILITY to excessive bleeding can seldom be attributed to lack of fibrinogen. Yet the efficiency of clot formation depends as much upon adequate fibrin as upon any other link in the chain of coagulation factors. There must, therefore, be a critical level of fibrinogen concentration below which coagulation produces clots too friable to be hæmostatically effective. While the exact position of this critical level has not been determined, there is reason to suppose that it lies considerably below the normal limits. Since the large fluctuations in fibrinogen concentration that are present in a variety of conditions are almost invariably on the high side of

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normal, it follows that true fibrinopenia with hæmorrhage is not often seen. Occasionally however it does occur, and the recorded instances may be divided into two groups. In the first, certain conditions, such as extensive disease of the liver, may be accompanied by a reduction of blood fibrinogen severe enough to result in deficient coagulation and consequent hæmorrhage. In the other group there is a similar reduction, or even absence, of fibrinogen without obvious causation, appearing to be an inborn error.

Six examples of this latter condition have been described, and in two of these there was no detectable fibrinogen present in the blood. In all, there was a history of hæmorrhage from infancy, the deficiency appearing to be congenital, and in two of them, other members of the family were similarly afflicted. The case that follows is reported as an example of this rare disorder.

HISTORY

The patient, a boy, was born in March, 1929.

He was a full-term baby, weighing 8¾ lb. Four days after birth he began to bleed from the umbilicus, and continued to do so for 14 days in spite of injections of his parents' blood. At the age of 4 months he began to show bruises, and has bruised easily and extensively ever since. Two months later he bled for three days from a needle scratch on the hand. At the age of 16 months he bled for 14 days "off and on" from an abrasion on the lip, and was subsequently admitted to St. Bartholomew's Hospital.

Examination revealed no physical abnormality except for several bruises, and a slight bossing of the skull.

Investigations.—Blood count normal, apart from a slight hypochromic anæmia. Platelet count: 110,000 per c.mm. Coagulation time: blood still fluid in Dale and Laidlaw tube after 2¼ hrs. Bleeding time: 30 min. (Dukes). Blood calcium: 10·5 mg. per 100 c.cm. plasma. Wassermann reaction: negative.

Treatment.—He was treated by injections of his parents' blood and, in view of the thrombocytopenia, by a liver diet and X ray irradiation of the spleen. He was discharged, apparently improved, after a stay of 10 weeks, during which the platelet count had fluctuated between 50,000 and 140,000 per c.mm.

During the next five years he had several hæmorrhages from tooth-sockets and minor injuries, each lasting from 3–5 days. At the age of 6, following a blow on the arm, a hæmorrhage occurred in the region of the left shoulder. Following this the muscles of the upper arm wasted, and there was some limitation of movement.

READMISSION

In June, 1936, he was again seen at St. Bartholomew's Hospital, and admitted for the investigation of his clearly interesting hæmorrhagic diathesis.

On examination he was a cheerful, apparently healthy small boy. There was some wasting of the biceps, triceps, and deltoid on the left side, and limitation of movements at the shoulder-joint, particularly abduction of the arm. Radiography of this region showed no abnormality beyond a slight decalcification. No other joints were affected. There were various bruises, but no further abnormality to be found by clinical examination.

EXAMINATION OF THE BLOOD

The following investigations were made:

Blood count:

Red cells	4,200,000 (per c.mm.)	White cells	6000 (per c.mm.)
Hæmoglobin	76%	Polymorphs.	71%
Colour-index	0·9	Lymphocytes	21%
		Monocytes	7%
		Eosinophils	1%

Platelet count: 110,000 per c.mm. (Lempert-Kristenson). Coagulation time: indefinitely long; a sterile sample of blood still contained no trace of clot after 3 weeks. Bleeding time: over 30 min. (Dukes). Tourniquet test: weak positive. Sedimentation-rate: 2 mm. in 4 hours. Wassermann reaction: negative. Sigma reaction: negative. Lævulose-tolerance test: within normal limits. Van den Bergh reaction: direct, negative; indirect, 0·3 mg. per 100 c.cm.

In addition to thrombocytopenia, therefore, there was a complete incoagulability of the blood, a condition which is not met with even in the severest cases of hæmophilia.

In order to investigate this failure of coagulation, the various factors responsible for coagulation of the blood "in vitro" were prepared.

Thrombokinase: Russell's viper venom behaves as if it were an extremely powerful thrombokinase. A 1 in 10,000 solution was used.

Prothrombase was prepared by Mellanby's method. A sample was, however, kindly provided by Prof. Mellanby himself, and this proved even more active.

Calcium: 1·18 per cent. (isotonic) calcium chloride solution was used.

Thrombase was obtained by activation of prothrombase with calcium.

Fibrinogen was prepared from Berkefeld-filtered plasma by fractional precipitation with neutral salts. Negligible contamination by prothrombin was shown by its incoagulability in the presence of calcium, over a period of several days.

Normal blood used in the control experiments was obtained by venepuncture, using clean dry syringes. A part was citrated by mixing nine volumes of blood with one volume of 3·8 per cent. sodium citrate solution. Plasma was separated from this by centrifuging at slow speed. Serum was obtained by allowing the whole blood to clot firmly, and then centrifuging. The patient's blood was treated in the same way, but the absence of coagulation resulted in some terminological confusion with regard to "serum" and "plasma."

Coagulation experiments were carried out in small Wassermann tubes at 37° C., and timed to the point at which inversion would not spill the contents.

The results of these experiments are summarised in the Table. The figures in parentheses in the "experiment" column refer to the proportional volumes of the fluids used.

—	Experiment.	Result. 1. Normal control.	Result. 2. Patient.
1	Whole blood (10).	Clot in— 7 min.	No clot in 3 weeks.
2	Whole blood (9); calcium chloride sol. (1).	7 min.	
3	Whole blood (9); 0·01% Russell's viper venom (1).	13 sec.	
4	Whole blood (9); thrombin solution (1).	1 min. 20 sec.	
5	Plasma (9); thrombin solution (1).	2 min. 27 sec.	
6	Fibrinogen solution (9); thrombin solution (1).	1 min. 53 sec.	—
7	Serum (9); fibrinogen solution (9); thrombin (1).	2 min. 5 sec.	Clot in 2 min. 15 sec.
8	Serum (5); fibrinogen solution (5).	16 min.	About 2 hrs.
9	Plasma heated to 55° C.	Precipitate in 5 min.	No ppt. in 20 mins.
10	Plasma; 25% saturated with $(NH_4)_2SO_4$.	Heavy ppt.	No ppt.

The first experiment shows that the patient's blood will remain fluid indefinitely, when kept sterile, whereas normal blood under the same conditions clots in 7 minutes. Secondly, calcium chloride solution added in the same proportions to the normal and abnormal blood has no effect on the coagulation time of the first, and produces no clotting in the second, showing that this absence of coagulation is not due to absence of available calcium. Next Russell's viper venom clots normal blood in 13 seconds, but can produce no coagulation in the patient's blood, and similarly thrombin accelerates the clotting of the one but fails to coagulate the other.

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At this point, therefore, the inference is that either there is absence or inactivity of fibrinogen in the patient's blood, or that there is a powerful antithrombin present. To distinguish between these, the fibrinogen solution was prepared, and Experiment 6 shows that this solution is readily clotted by thrombin. Next, fresh serum was obtained from normal, and from the patients, blood and the fibrinogen solution, with thrombin, added to each. In the case of the normal the fibrinogen was clotted in 2 minutes 5 seconds, and in the case of the patient in 2 minutes 15 seconds. Thus it appears that the failure of thrombin to clot the patient's blood is not due to the presence of an antithrombin.

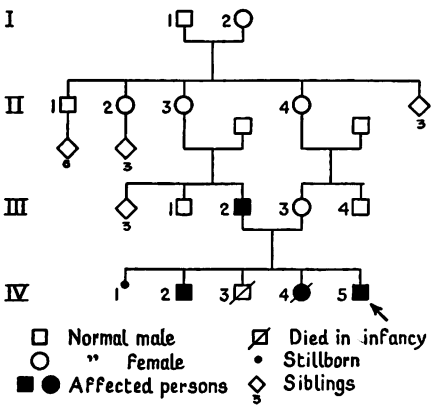
In Experiment 8, fibrinogen solution was added to normal and abnormal serum alone, coagulation occurring in the first instance after 16 minutes, and in the latter after 2 hours. This shows that not only is there no overwhelming antithrombin in the patient's blood but that there is some active thrombin formation. Since even so low a concentration of fibrinogen as 5 mg. per 100 c.cm. produces quite a firm gel, it appears that either there is absence or complete inactivity of fibrinogen in the patient's blood, as not even a strand of fibrin was formed in any of the first five experiments.

Two familiar tests for fibrinogen were therefore carried out. One consisted of heating the plasma to 55° C., and the other of adding ammonium sulphate to 25 per cent. saturation. Both these procedures gave an immediate heavy precipitate of fibrinogen with normal plasma, but none, at any time, with the patient's plasma. It can therefore be assumed that no protein having the normal characters of fibrinogen exists in detectable amount in the patient's blood.

The other plasma proteins were determined, albumin being 4·6 mg. and globulin 1·4 mg. per 100 c.cm.

FAMILY HISTORY

The family history was next investigated and is summarised in the pedigree:



I/1 and 2 were apparently normal.

II/1 had six normal children. II/2 had three normal children. II/3 normal. II/4, the patient's grandmother, had no history of any hæmorrhagic tendency, the blood fibrinogen being 250 mg. per 100 c.cm.

III/1 has two normal children. III/2, the patient's father, was healthy with no hæmorrhagic tendency. The blood fibrinogen was 75 mg. per 100 c.cm. estimated on one occasion only. The Wassermann reaction was negative. Coagulation and bleeding times normal. III/3, the patient's mother, was healthy, with no hæmorrhagic tendencies; blood fibrinogen 240 mg. per 100 c.cm.; platelets 360,000 per c.mm.; coagulation and bleeding times normal; Wassermann reaction negative. III/4 has five normal children; healthy.

IV/1, a female, stillborn. IV/2 bled for 3 days after circumcision; no other hæmorrhagic tendency; operation on knee for removal of cartilage, with no undue bleeding; blood fibrinogen 320 mg. per 100 c.cm.; platelets 260,000 per c.mm.; bleeding and coagulation times normal, Wassermann reaction negative. IV/3 premature; imperforate anus; died aged 5 days. IV/4 bled to death from umbilicus, aged 10 days. IV/5, the patient.

The main points of this family history are: (1) the patient's parents are first cousins; (2) two other children in the fourth generation showed a liability to hæmorrhage, one dying and the other completely recovering; (3) the patient's father, III/2, had, on one occasion, a low blood-fibrinogen concentration. In these investigations the blood fibrinogen estimations were made by the micro-Kjeldahl, and the platelet counts by the Lempert-Kristenson method. They are unfortunately incomplete, as the family now resent the number of "tests" they have been called upon to suffer.

FURTHER PROGRESS

After his discharge the boy remained remarkably well until August, 1937, when he began to bleed from a small abrasion on his palate. He was again admitted and the bleeding controlled by a dental plate.

Investigation showed a remarkable change in the blood picture. The platelets had risen to 425,000 per c.cm. and the bleeding time was normal at 5 min. 30 sec. There was still no trace of fibrinogen in his blood. The serum investigations gave the following results (mg. per 100 c.cm.): potassium 19·1, calcium 9·9, sodium 347·0, phosphate 4·4. The sedimentation-rate was 1 mm. in 1 hour. He was discharged, and has remained well since, with a persistently normal platelet count.

DISCUSSION

The main points of this case are as follows:

(1) The history of a hæmorrhagic tendency from earliest infancy.

(2) Incoagulability of the blood, found at the age of 16 months, and later shown to be due to complete absence of fibrinogen.

(3) Thrombocytopenia persisting until the age of 8 years, when it suddenly remitted, without however a remission of the hæmorrhagic tendency, and without the appearance of any fibrinogen in the blood.

(4) A history of fatal hæmorrhage in 1 sister, severe hæmorrhage in 1 brother, now normal, and a low blood fibrinogen in the father.

(5) The first cousin union of the parents.

The first two points put this case into the group of "constitutional fibrinopenias" described by Risak (1935). He reports four cases in which there was a history of hæmorrhage from infancy, and in which fibrinopenia without obvious causation was found in adult life. In two of these, other members of the family also had a similar deficiency, but in none was there complete absence of fibrinogen. It is extremely interesting that three of these cases also had thrombocytopenia, the platelets varying from 99,000 to 144,000 per c.mm., which appears to establish a remarkable, and at the moment inexplicable, association.

Two other cases of this condition have been described in children, one in a boy of 9 years by Rabe and Salamon (1920) and the other a girl of 8 months by Opitz and Frei (1921), in both there was absence of fibrinogen, and death from hæmorrhage occurred in childhood. Fibrinopenia secondary to liver disease, to leukæmia, to carcinomatosis, and to generalised tuberculosis, has been described by Frank (1925), Risak (1935), Jürgens and Trautwein (1930), and Opitz and Silberberg (1923) respectively. but this condition is obviously unconnected with that under discussion, though of interest with regard to the question of fibrinogen formation.

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Constitutional fibrinopenia, therefore, appears to be a congenital condition of unknown ætiology, sometimes associated with thrombocytopenia, and probably hereditary.

In the case recorded, the first cousin union of the parents, and the history of hæmorrhage in three of their children, suggests the inheritance, and exhibition, of a recessive character. It may thus be classed with other inborn errors that sometimes occur in the children of first cousin intermarriage. Not the least remarkable point about the case is the fact that this boy, with completely incoagulable blood and, for a considerable period, thrombocytopenia in addition, has escaped a serious hæmorrhage while leading a relatively normal life.

I am grateful to Dr. George Graham for his interest and help, and for allowing me to make use of the investigations made during the patient's last admission to hospital. My thanks are also due to Dr. A. E. Gow, under whose care the boy was admitted previously, for his permission to publish the case, and to Prof. G. Hadfield for his encouragement and advice.

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ERYTHROCYTE SEDIMENTATION AND THE PLASMA FIBRINOGEN

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THE discovery by Macfarlane of a boy whose blood contained no fibrinogen (Macfarlane 1938) offered a unique opportunity of studying the relationship between this substance and erythrocyte sedimentation.

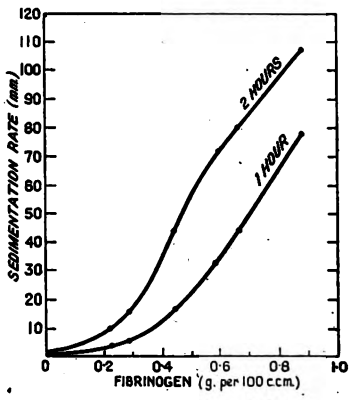
In his classical work on sedimentation Fahraeus (1921) indicated that the composition of the plasma plays the chief rôle, whereas the condition of the red corpuscles is far less important. Hoeber (1904) and he also showed that of the constituents of the plasma fibrinogen especially influenced sedimentation, for if blood with a high sedimentation-rate (S.R.) is defibrinated the S.R. approximates to normal. Plass and Rourke (1927) reached the same conclusion as a result of an investigation into the influence of venous stasis on plasma protein and S.R. These authors confirmed the work of Rowe (1915), Peters (1924), and others, who had observed that venous stasis produces a rise in plasma proteins and particularly in fibrinogen, but they also showed that this was accompanied by a parallel increase in S.R. The plasma fibrinogen and S.R. were further shown by Ernstene (1930) to have a direct relationship in rheumatic fever while, working on the same aspect of the subject in nephritis, I found a similar relationship (unpublished).

The complete absence of fibrinogen in the blood investigated by Macfarlane made it possible, by the following simple method, to prepare with a minimum of manipulation samples of blood of known but varying fibrinogen content and to compare their S.R.

METHOD

A subject was chosen whose blood sedimentated with moderate rapidity, and the fibrinogen content of his plasma was estimated by the colorimetric method.

Of this blood 8 c.cm. were drawn into a syringe containing 2 c.cm. of 3·8 per cent. sodium citrate solution. A similar quantity of blood and sodium citrate was obtained by the same technique from the boy and the two samples rapidly mixed in a series of known proportions. Unmixed samples of both bloods and those containing known but varying quantities of each blood were put up in Westergren sedimentation tubes, and readings taken at the end of one and two hours. The fibrinogen contents of all samples were calculated, and the results, together with the corresponding S.R., are shown in the Table and Graph.



Relationship of sedimentation-rate to concentration of fibrinogen.

RELATION OF SEDIMENTATION-RATE TO FIBRINOGEN CONTENT

Fibrinogen (g. per 100 c.cm.).	Sedimentation-rate (mm.). First hour.	Second hour.
0·0	0·3	1·0
0·22	4·0	10·0
0·29	5·0	16·0
0·44	17·0	44·0
0·59	33·0	72·0
0·66	45·0	80·0
0·88	78·0	107·0

It will be seen that the blood that contained no fibrinogen gave almost negligible S.R. at both one and two hours, and that the rates of the mixed samples rose progressively with the fibrinogen content to a maximum of 78 (one hour) and 107 (two hours) in the unmixed blood of the chosen patient.

CONCLUSIONS

It is clearly impossible to draw definite conclusions from the results of an experiment in which all the other factors known to influence sedimentation were not controlled. Anæmia, a recognised factor, can however be ruled out as the hæmoglobin content of both bloods was approximately normal, while the effect of temperature and manipulation of the blood can be disregarded as they were presumably the same for each sample of blood. Possible errors in the estimation of plasma fibrinogen on a number of different samples of blood are also excluded in this experiment.

In the present state of our knowledge of the factors influencing erythrocyte sedimentation the above results may reasonably be interpreted as confirming the view that fibrinogen plays a large, and probably the largest, part in determining the rate of sedimentation of human blood.

I wish to thank Dr. George Graham for permission to perform this experiment while the patient was under his care, and also for his interest and help.

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AIR EMBOLISM IN URETHROSCOPY AND TUBAL INSUFFLATION

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THE recent occurrence of two fatal cases of air embolism in Liverpool as a result of minor operative procedures prompts us to record the details and consider the mechanism of the accident.

CASE REPORTS

CASE 1.—A negro, aged 45 years, attended a dispensary for the treatment of his urethral stricture. The stricture was located with a metal sound and passage attempted with a No. 1 English gauge gum elastic bougie and with a whip without success. A slight hæmorrhage resulted from these attempts but was not sufficient to obscure the view when an air-inflating urethroscope was passed. The stricture was visualised clearly while air was blown in by means of hand-operated bellows. No record was kept of the volume of air introduced and during the examination it was escaping freely from the meatus. Suddenly, without any warning, the patient collapsed and became pulseless. The urethroscope was withdrawn and artificial respiration applied for 15 minutes without avail. Intracardiac injection of 1 c.cm. of 1/1000 solution of adrenaline hydrochloride was given. No anæsthetic had been administered.

Autopsy was performed four hours after death. "On opening the body large quantities of air welled out of the large veins in the neck. The cavities of the right side of the heart were distended with air bubbles which could be seen through the thin and distended right auricle. Air bubbles were present in the main branches of the pulmonary artery. The urethra showed a dense stricture 7 in. from the meatus through which a flexible probe could not be passed per meatum. On opening the urethra the mucous membrane was found to be bruised and abraded anterior to the stricture but no gross tears or visible patent vessel could be found; in fact the condition to the naked eye was simply one of recent ecchymoses about ¼ in. in length on the proximal side of the stricture. There was no false passage. The bladder contained about 6 oz. of urine; it was definitely hypertrophied. Except for an enlarged spleen which microscopically showed grossly distended sinuses and weighed 25½ oz. the other organs of the body were healthy."

CASE 2.—A woman, aged 41, who had been married thirteen years without a pregnancy. Her doctor had tested her husband for potency and found active and normal spermatozoa. She had always menstruated regularly and without pain. She denied ever having any vaginal discharge, and had always been in good health. Ten years ago a posterior section of the cervix was performed in the hope of curing her sterility but without effect.

On examination the vulva and vagina were normal. There was a hare-lip condition of the cervix due to the previous operation, but no evidence of erosion or cervicitis. The body of the uterus felt normal in position, size, and mobility, and the appendages felt normal. There was no apparent pelvic abnormality. Her general condition was healthy, and clinically all other systems were normal.

Operation.—She was admitted to the Mill-road Infirmary for a Rubin's test of patency of Fallopian tubes by air insufflation on the day prior to her expected menstrual period. She was anæsthetised with ethyl chloride followed by open ether through a Halton's mask. The uterus was found to be of normal depth: a uterine sound passed freely through the internal os. An intra-uterine catheter passed easily and without the slightest resistance. The insufflator was attached and air introduced at a pressure of 150 mm. of mercury; its passage through the tubes was considered proved by the clinical test of listening over the lower abdomen. On repeating the test three times up to a pressure of 200 mm. of mercury three observers heard the hissing sound supposed to be characteristic of air passing through the Fallopian tubes into the peritoneal cavity. The total volume of air used was 150 c.cm. When the catheter was withdrawn a very slight trickle of blood was noticed flowing from the os. At this point the anæsthetist remarked that the patient was in poor condition. She suddenly became cyanosed and respirations ceased. The heart was beating rapidly but feebly. She gave two deep gasps and died within four minutes despite cardiac stimulants and artificial respiration.

Autopsy was performed 22 hours after death. The body was that of a well-nourished woman about 40 years of age. There were no external signs of illness or injury. The pelvic peritoneum was smooth and glistening. There were a few delicate adhesions around both Fallopian tubes, but these were not sufficient to produce any distortion. The uterus and its appendages were uniformly hyperæmic as in the immediate premenstrual condition. The serous coat was perfectly smooth, and the hyperæmia was not of inflammatory origin. The uterine veins were full of bubbles of air. The right ovary showed a recently ruptured corpus luteum. The cervix contained some blood-stained gauze packing, and there was the scar of an old posterior cervical section. The endometrium was hyperæmic, but the site from which the bleeding had occurred could not be found. On squeezing the left tube a bead of yellowish fluid was expressed; this proved on subsequent microscopic examination to be no more than desquamated epithelial cells with a few Gram-positive cocci. The inferior vena cava was full of a frothy mass of air bubbles. The right auricle and ventricle were dilated and tympanitic to percussion; on opening them in situ they were found to be full of air, with only a few bubbles mixed with blood between the trabeculæ. The pulmonary artery and its main branches were also full of air. No air was found in the pulmonary vein, the left side of the heart, or in any of the other vessels in the body. The weather was cold, and there was no question at all of the gas being due to decomposition. Microscopic examination of the uterine mucosa showed it to be in the immediate premenstrual or menstrual stage. Death was due to air embolism.

PREVIOUSLY RECORDED CASES

Inflation of the urinary tract.—A very important paper is that of Mathé (1929), who had a fatality from air embolism during dilatation of the bladder with air and circularised many other urologists inquiring whether they had had similar accidents. By this means and from a search of the literature he collected records of 31 cases due to injection of air into some part of the urinary tract for radiological examination or for direct observation with the cystoscope. Among these were 5 cases occurring during urethroscopy, of which 2 were fatal and 3 made a complete recovery. Rettig (1930), in a review of the German articles of air embolism, mentions cases due to filling the bladder with air but none associated with urethroscopy. Jeck (1933) had a death from air embolism while distending the bladder with air to facilitate supra-

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pubic cystotomy; in this instance air entered the vesical veins through an ulcerated carcinoma.

Insufflation of the Fallopian tubes.—In view of the frequency with which the operation of tubal insufflation is performed it is surprising that we have found references in the literature to no more than 6 cases of air embolism, of which 3 were fatal. Two fatal cases are reported by Moench (1927); one of these was certainly due to air embolism, but in the second autopsy was not performed until after embalming, and the diagnosis was made on clinical grounds. Mansfeld and Dudits (1934) quote 3 non-fatal cases already reported, and describe one fatality of their own. Death occurred two minutes after insufflation of about 190 c.cm. of air under a pressure of 110 mm. of mercury. The patient was found at autopsy to have tuberculous salpingitis and endometritis, with a submucous fibroid.

MECHANISM OF DEATH FROM AIR EMBOLISM

The exact means by which death is brought about in air embolism has long been a subject for discussion. The chief theories are that it is due to the formation of an air-lock in the chambers of the heart, blockage of the branches of the pulmonary artery by bubbles of air, and consequent arrest of the whole pulmonary circulation, cardiac infarction from filling of the coronary arteries, and cerebral air embolism.

Before considering these theories in detail it is essential to remember that air may be introduced into the pulmonary or into the systemic venous circulation, and thus reach the left or the right heart, and it is possible that the mechanism of death may not be the same in each instance. In the absence of a patent foramen ovale or of a defect in the interventricular septum air from the systemic veins must pass through the lungs to reach the coronary arteries.

Mansfeld and Dudits (1934), in their account of the autopsy findings in their case, mention that the right heart and pulmonary artery were distended with air, and that foam was present also in the left heart and the aorta, and in the coronary arteries. The heart was opened under water, but there is no mention of tying the aorta and its branches so as to exclude the entry of air. They also found bubbles in the basilar and middle cerebral arteries. The skull was apparently opened after the examination of the rest of the body, and one almost invariably finds air in the vessels at the base of the brain at any autopsy unless extraordinary precautions are taken. Fragmentation of muscle fibres in the wall of the left ventricle, which was claimed to be further evidence of cardiac infarction in this case, is found in a variety of other conditions. The evidence in the case reported by these authors does not seem to prove that any air passed through the lungs to the left heart.

Jung and Pierre (1935) in experiments on dogs found that when air is injected in large quantities into the systemic veins death is due to filling of the right heart with air, but when small amounts are injected slowly a few bubbles may pass through the right heart and the pulmonary capillary bed to reach the left heart and the brain, producing disturbances of the central nervous system, but they add that this is an exceptional occurrence.

Pfanner (1936) believes that death in air embolism from the systemic veins is due to filling of the right heart with foam which is compressible but cannot be expelled, so that right-heart failure results; but Lenggenhager (1936) was able to kill animals by injecting air directly into the pulmonary artery, there being no filling of the right heart with air and no formation of foam; and he found that intraventricular injection of alcohol or ether, as was suggested by Pfanner for the purpose of dispelling foam, was ineffective. Lenggenhager considers that death is due to blocking of the pulmonary artery and arrest of the pulmonary circulation.

It is thus evident that if a large quantity of air be injected it will fill the whole right heart as well as the pulmonary artery, but it seems that the latter is the more important factor. In the two cases here reported the right heart and pulmonary artery were both full of air.

When air is injected into the pulmonary veins, as may happen during the induction of artificial pneumothorax or in operations on the lung, the mechanism of death from air embolism may be very different from that just described.

In an admirable article Chase (1934) describes a fatality caused by cutting the pulmonary vein during a lobectomy operation. The head was examined radiographically after death, and air bubbles were seen in the circle of Willis and in the cerebral vessels. At autopsy the brain was examined with great care before the trunk was opened, and there were subarachnoid hæmorrhages, perivascular hæmorrhages in the brain and air in the meningeal and cerebral arteries but not in the veins; the latter were greatly distended with blood and microscopical study showed that the hæmorrhages were on the venous side of the capillaries. There was also frothy blood in the left heart and bubbles of air in the coronary arteries. In a series of experiments on rabbits Chase showed in great detail how small quantities of air will produce perivascular hæmorrhages.

Hamilton and Rothstein (1935) record some interesting cases of air embolism due to artificial pneumothorax and the entry of air into the pulmonary vein. Of 7 non-fatal cases 6 showed signs of cerebral disturbance,—convulsions, pareses, decerebrate rigidity, &c.—but they recovered completely in a few days. The seventh patient was only momentarily unconscious. It is likely that these patients had perivascular cerebral hæmorrhages of the type described by Chase.

The evidence in favour of coronary artery occlusion as the chief cause of death in air embolism derived from the pulmonary veins is not very conclusive, although it cannot be denied that air may find its way into these vessels. Durant (1935) reports a case, due to artificial pnnemothorax in which the patient became faint, cyanosed with slow respiration and imperceptible pulse, and lost consciousness. Recovery followed the administration of adrenaline and caffeine. It happened that an electrocardiogram had been taken seven days before the accident, and another was taken 2 hours 55 minutes after it. The latter gave a picture which was described as typical of cardiac infarction. Three subsequent electrocardiograms gave evidence of a gradual return to normal. This is interpreted as proof of air embolism of the coronary arteries.

In conclusion it appears to us that clearly the two circulations must be considered separately. Occlusion of the coronaries by air bubbles, in the absence of direct communication between the right and left sides of the heart may, we think, be ruled out in cases of massive air embolism on the right side. Death takes place with dramatic suddenness and is due to the presence of a large volume of air in the right auricle and ventricle. This is churned by the movements of the heart into a foamy mass, which surges backwards and forwards in cardiac systole and diastole and effectually blocks the passage of blood into the pulmonary arteries. The circulation is thus brought to a standstill. The whole course of events can well be seen in the rabbit if an injection of air be given into an ear vein and the chest rapidly opened. On the other hand where air enters directly into the pulmonary veins it is clear that embolism

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of systemic arteries can follow and with these the coronaries may be involved. What is more difficult to explain is the mechanism of the entry of air, in cases such as those we have reported, into the venous system where no large venous trunks have been opened and the air is present under pressure in the confines of natural cavities. Here, as in both of our cases, only minor and superficial degrees of trauma were produced and a priori it might be thought that the effect of the compressed air would be to collapse any small veins in their walls rather than to open them up in such a way as to allow its entry. It seems to us that the probable explanation is that the air enters during the course of the stretching or dilatation of the cavity in question, and that in this process such a patency is produced in superficial veins ruptured by the slight trauma which was applied as to allow air to pass readily into them. In both cases the air pressure applied was relatively low and no question of active tearing or rupture of the tissues by highly compressed air would seem to arise.

PRECAUTIONS FOR AVOIDANCE OF AIR EMBOLISM

In nearly all the recorded fatalities from air embolism it seems that considerably more than 100 c.cm. of air was introduced in a short period of time. It is probable that the risk of air embolism could be abolished in insufflation of the Fallopian tubes if the amount of air introduced were carefully measured and never allowed to exceed 100 c.cm. in all. Rubin (1932) always uses carbon dioxide because it is absorbed rapidly, but it is doubtful whether this precaution is necessary if the amount of air used is carefully controlled. He also says that genital inflammations, menstruation and the pre-menstrual phase, abnormal bleeding from the genital tract, pregnancy and severe constitutional diseases contra-indicate the test. In Rubin's opinion the post-menstrual phase, from the fourth to the seventh day after the menses cease is the most favourable time for insufflation. The clinical test of auscultation of the lower abdomen and hearing the hissing sound of the passage of air might well be fallacious as a sign of patency of the Fallopian tubes. We think it likely that the sounds heard in our case were due to air passing into the blood-vessels. When urethroscopy is contemplated it should be done before, and not directly after, the passage of sounds; and the danger of air embolism should always be borne in mind before introducing air into any viscus in the wall of which there is inflammation or congestion or recent trauma.

SUMMARY

Two fatal cases of air embolism are reported. One occurred during urethroscopy after the passage of sounds in a man with a urethral stricture. The second was in a woman whose Fallopian tubes were insufflated on the day before her menstrual period was expected. Other recorded cases are reviewed. The mechanism of death from air embolism is discussed and certain precautions for its avoidance suggested.

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"GAS-OXYGEN" AND CEREBRAL CONGESTION

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THE search for the best anæsthetic for neurosurgery has led to the trial of various methods. At the present time, in American and continental clinics, local anæsthesia is used almost universally. Theoretically it offers certain advantages over other forms of anæsthesia in these cases, namely:—

1. There should be less alteration in the patient's general condition than if an inhalational anæsthetic is given.
2. Blood loss during the tedious period of surgical entry should be greatly reduced.
3. One should be able to follow the patient's immediate post-operative course more closely than if the clinical picture is obscured by general anæsthesia.
4. The incidence of post-operative vomiting with its attendant risk of reactionary hæmorrhage should be lessened.

Nevertheless, even if no pain is felt, the ordeal of lying in one position—often an uncomfortable one—for anything from three to six hours is too great for most conscious patients to endure, and some form of narcosis has to be used. The drugs most commonly employed are Avertin, Luminal, Evipan, and morphia, either alone or in various combinations. There is, however, one objection common to all. If the narcosis produced is deep enough to be effective, respiration is liable to become obstructed—especially if the patient is in the prone position—and venous congestion results. This congestion is the greatest bane of the neurosurgeon, and may be an insuperable bar to good surgery. The narcosis moreover often passes off before the operation has been completed, and the patient becomes restless and unmanageable, possibly at the most critical stage of the surgeon's work. If a mouth or tracheal tube has been passed to overcome respiratory obstruction, the patient may strain or cough in his efforts to remove it. In most American clinics a nurse administers open ether at this point—a difficult procedure, especially with the patient lying prone. On the Continent evipan is usually given. Injections of hyoscine and the rectal administration of more avertin are also used.

Whatever supplementary narcosis is employed, the surgeon's task is, almost always, made more difficult by a subsequent rise in intracranial tension and by venous congestion. Moreover such interruptions of the smooth performance of a major operation are alien to the atmosphere of a modern theatre and do not make for good surgery. Complete and lasting control of a patient and of his respirations can only be ensured by some form of general anæsthesia.

Nitrous oxide oxygen would be universally regarded as the general anæsthetic of choice for this work but for the possibility of its causing cerebral congestion. Some anæsthetists think that a certain amount of congestion is inevitable with gas-oxygen (Ayre 1937) and that since congestion, in addition to increasing hæmorrhage, raises the intracranial tension, this anæsthetic should be avoided (Wood 1932). Others have stated that these complications are more traditional than real, and that when they occur they are due rather to maladministration than to any properties inherent in the anæsthetic (McCarthy and others 1934). I would submit that the congestion that can and only too often does accompany this form of

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anæsthesia arises from one or more of three causes, and that all three can be avoided by suitable methods. The three causes of cerebral congestion under nitrous oxide oxygen are: (1) An insufficient proportion of oxygen in the gas-oxygen mixture. (2) Respiratory obstruction. (3) Faulty position of the patient.

INSUFFICIENT OXYGEN

It is essential that a high proportion of oxygen be given and the least trace of cyanosis avoided. Without lightening anæsthesia to such an extent that the patient becomes unmanageable, maintenance with the desired high percentage—i.e., 15–20 per cent. of

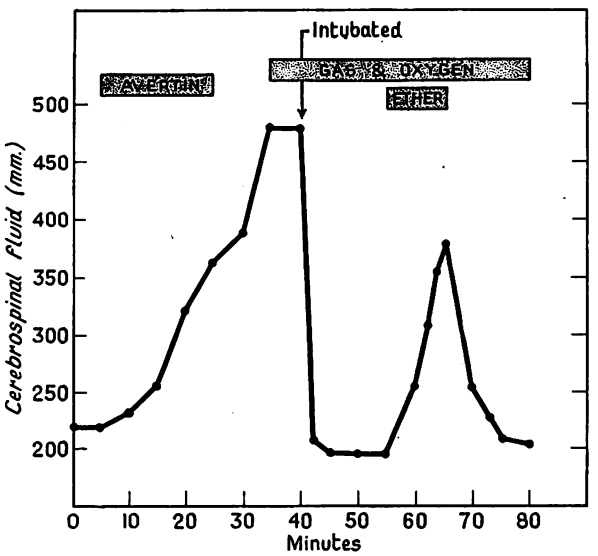

FIG. 1.—Typical chart showing period of administration and effect of avertin, gas and oxygen, and ether on pressure of cerebro-spinal fluid. Note rapid fall after intubation.

oxygen—can be effected either by the addition to the mixture of small amounts of ether or chloroform, or by premedication. Apart from the fact that the prolonged use of lipoid-soluble anæsthetics, such as ether or chloroform, is not permissible in these cases because of their possible toxic effects (Hewer 1937), I am reluctant to use even the smallest amounts of ether because of the resulting rise in intracranial tension. I have found that the gradual addition of ether to the gas-oxygen mixture under which a patient is thoroughly "settled" can double the intraventricular pressure in five or ten minutes.

A series of four patients were placed in the left lateral position, and under local anæsthesia Mr. G. F. Rowbotham inserted cannulæ into their right lateral ventricles. Each cannula was connected to a long glass tube with a very small lumen which was held vertically, and on which the height of the fluid could be read off on a millimetre scale. Avertin was run into the rectum till narcosis ensued. Anæsthesia was then induced with gas and oxygen, and after a few minutes the patients were intubated. Ten to fifteen minutes later, when they were thoroughly settled, ether was added very slowly. The cannula and tube were kept in position throughout and readings were taken continuously.

Fig. 1 is a typical chart of the results obtained. It shows first of all a rise in intraventricular pressure after the administration of avertin. In my experience the accepted view that avertin lowers the intracranial tension is misleading. It may do so, but in many cases the reduction is more than offset by a rise due to respiratory obstruction accompanying avertin narcosis. A similar further rise in pressure occurred under gas and oxygen.

Up to the present the only evidence regarding the effect of nitrous oxide and oxygen on intracranial tension is that put forward by McCarthy, McKesson, and Clement (1934), who found that no increase in tension occurred in two patients from whose skulls large bone flaps had been previously removed and whom they had anæsthetised with gas and oxygen. Unfortunately their estimations of intracranial tension were obtained by palpation through skin and muscle, and possibly through dura and hair, and consequently are of little scientific value. As shown on the chart, the intraventricular pressure in my patients only fell below the normal conscious level when the avertin and the gas-oxygen were followed by intubation.

Ether can be avoided and the desired high percentage of oxygen made possible by heavy premedication.

For 300 neurosurgical cases I used avertin as a basal anæsthetic. The results, while encouraging, were not wholly satisfactory. About one case in ten required some ether in addition, and a still greater proportion had undesirably rapid pulse-rates, due perhaps in part to the atropine that they all received. More recently I have given adults Omnopon gr. 1/3 and scopolamine gr. 1/300 an hour before the administration of the avertin is begun. During this hour the respiratory rate is counted every ten minutes, so that prompt measures may be taken should the patient show any abnormal susceptibility to these drugs.

The full surgical dose of avertin is prepared, the dose being based on estimated blood volume rather than gross body-weight, and three-quarters of it is given to the patient over a period of 12–15 minutes. If he is then asleep he is wheeled to the theatre and induced immediately. If he is awake, the nurse waits ten minutes and then if he is still conscious, gives the remainder very slowly until narcosis ensues. No atropine is given.

The patients' general condition has been very much better in every way since they have received omnopon-scopolamine before the avertin; 20 per cent. of oxygen can usually be given, the hyperpnœa sometimes seen under avertin and gas-oxygen does not occur, and most striking of all, pulse-rates rarely exceed 80 except in response to a severe hæmorrhage, or to the sudden release into the circulation of histamine-like substances such as occurs when a large frontal or temporal flap is replaced in position after three or more hours. I consider this most important. The readings of the patient's pulse-rate and blood pressure at the start of the operation should approximate as nearly as possible to those during normal sleep. An initially high pulse-rate alone may prevent the surgeon from carrying through a necessary operation, and land him in difficulties from which he is unable to escape.

This premedication may appear dangerously heavy in cases of posterior fossa tumours because of the risk of dangerous respiratory depression, but in practice this complication is less liable to occur with this premedication followed immediately by endotracheal gas-oxygen, than with a simpler and at first sight safer anæsthetic such as ether. Some years ago I used a gas-oxygen ether sequence with no premedication other than atropine, and I saw this phenomenon of respiratory depression in several cases of posterior fossa tumours, respirations becoming progressively shallower as induction proceeded. In two cases they ceased altogether and were only restarted, but that instantaneously, on the surgeon tapping one of the ventricles.

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This complication does not occur with the technique now employed, because the intracranial tension, far from being markedly raised by induction, is actually lowered once intubation has been performed. Such respiratory depression as does occur is the normal, or often less than the normal, response to these drugs, and therefore does not cause anxiety.

RESPIRATORY OBSTRUCTION

Under the heading of obstruction are included not only mechanical obstruction to respiration, but also gagging, straining, coughing, or pseudo-asthmatical attacks.

Respiratory obstruction has long been recognised as a potent source of congestion, the historical experiments of Muller and Valsalva showing how extreme obstruction could actually cause a momentary arrest of the circulation. The slightest mechanical obstruction will cause congestion to a greater or lesser extent, and anæsthetists owe a great debt to Magill and Rowbotham for their work on endotracheal anæsthesia. The use of wide-bore tracheal tubes has become accepted practice all over the world; and has contributed materially to the smooth effortless maintenance of many thousands of anæsthetics. Lately the widespread use of these tubes has been criticised; laryngeal granulomata (Gould 1935), post-operative chest complications (Dawkins 1937), and the increased incidence of pulmonary collapse being variously ascribed to their use. Whether or not these criticisms prove justifiable, for cranial surgery at least they must be disregarded—any remote risks attached to the employment of endotracheal tubes being more than offset by the immediate benefits obtained by their use. The introduction of a wide-bore tracheal tube is the first and essential step to completely smooth and unobstructed respiration, but it is only a step. The use of a tracheal tube does not of itself ensure unobstructed respiration under gas-oxygen anæsthesia for intracranial surgery. On the contrary it may even militate against it, as its presence may lead to gagging, straining, or even a paroxysm of coughing whenever the patient is moved. These interruptions of the even maintenance of anæsthesia usually occur when the operation is not actually in progress—e.g., when the head is raised for towelling or when the patient is placed in any special position, particularly the cerebellar. Consequently they are not of any great moment so long as they pass off quickly. On the other hand if there is coughing or straining during the course of an operation, owing for example to the use of the Gigli saw or bone nibbling over the posterior fossa, causing movement of the tracheal tube, they form a very annoying and even a dangerous complication.

Both to facilitate the introduction of a tube, and subsequently to make the patient more tolerant of its presence, Magill (1928) recommended the use of a 20 per cent. cocaine spray on the nose and pharynx. Later writers have advocated 2 per cent. Percaine (Hewer 1937). No one will deny the value of cocainising the nose, not because of the local anæsthesia obtained but because of the resulting shrinking of the mucosa. It has lately been suggested that apart from making the passage of the tube easier, this may also lessen the possibility of carrying infection downwards (Human 1937). I do not find, however, that spraying the pharynx with either solution has much effect in preventing the reflex coughing. This is only what one might expect, because the coughing that occurs when one moves a patient under endotracheal gas-oxygen is caused only to a very small extent by pharyngeal or glottic reflexes. It is due almost entirely to the stimulation of the distal end of the tube rubbing up and down on the wall of the trachea. One can show this quite easily by inserting a tube only just through the cords. Once anæsthesia is steadied again, one may take extreme liberties with the patient, suddenly flexing or extending the head or even rotating the proximal end of the tube without causing any alteration in the rhythm of respiration. Unfortunately it is not practicable to insert tubes only just through the cords as a routine measure because an active glottis might subsequently expel them.

The practical solution of the difficulty lies in efficient local anæsthesia of the portion of the trachea that may be stimulated by movement of the tube. It cannot be reached satisfactorily by spraying, either before induction or down the tube after intubation. The obvious method is to make the tube carry the local anæsthetic down with it in the form of a lubricant smeared on its outer wall. Vaseline containing various percentages of percaine was tried for this purpose but was not very successful. The fault lay not with the percaine but with the vehicle. Vaseline melted so quickly at body temperature that the percaine had not sufficient time to anæsthetise the mucosa. A number of paraffin oils and jellies were tried but those with a sufficiently high melting point were either too hard to be efficient lubricants or too fluid to cling to the tubes. Eventually the dispensary staff of the Manchester Royal Infirmary produced a compound that avoids both of these drawbacks. It has the formula:—

Paraff. dur.	gr. 15.
Cera alb.	gr. 30.
Paraff. moll, alb.	1 oz.
Percaine base	10 per cent.

If it is warmed slightly this preparation is soft enough to be an effective lubricant, while its consistency and melting point are such that some will be found still clinging to a tube after the latter has been four or five hours in the trachea. If some of it is smeared on the outside of a tracheal tube before the latter is inserted, the trachea is rapidly desensitised and any tendency to coughing or straining is definitely removed. I have found that this effect persists for four or five hours, and possibly would last still longer should this operative time ever be exceeded.

PSEUDO-ASTHMATICAL ATTACK

Another complication that can be caused in certain patients by the stimulus of the tube on the tracheal wall is a train of symptoms indistinguishable from an attack of asthma. In these subjects the introduction of a tube initiates a bout of coughing. When this subsides, there is very audible wheezing, with moist sounds due to excessive secretion, and the respiratory rate is increased and pulmonary ventilation considerably reduced. Most anæsthetists who intubate large numbers of patients under light anæsthesia must have met with this complication and found themselves for the moment uncertain whether or not the tube was still in the trachea, because of the very poor air-entry. Usually such symptoms pass off quickly; occasionally they persist to a greater or lesser extent, or disappear only to return if any subsequent movement of the tube occurs. Their presence is accompanied by marked cerebral congestion. Like the coughing and straining previously mentioned, these symptoms can be prevented by efficient local anæsthesia of the trachea.

The comparative avascularity of the operative field since I have used this anæsthetic lubricant as a

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routine measure has convinced me that there are many patients in whom the stimulation of the trachea by a tube causes some degree of cerebral congestion, though not one of these gross and obvious disturbances. The cerebral circulation is extremely sensitive to variations in intrathoracic pressure, and a circulatory disturbance so slight that it would pass unnoticed during an operation on another part of the body may be enough to make an intracranial operation very difficult, or even cause it to be temporarily suspended.

FAULTY POSITION OF THE PATIENT

A faulty position may cause either local or general congestion. Local congestion results from over-flexion or extension of the head, with consequent pressure on the big veins in the neck. This is not a common cause of congestion in intracranial operations, but it must be kept in mind when fixing a patient in the cerebellar position.

On the other hand the general congestion that follows faulty positioning of a patient for a cerebellar approach is extremely important in neurosurgery. It is essential that throughout an operation a patient should be able to breathe in his normal manner; a thoracic breather must be free to expand his chest, an abdominal breather must be free to move his abdomen. This freedom is obtained by carefully adjusting shoulder rests, pelvic rests, and sandbags according to each patient's physique and normal respiratory movements and in such a manner that breathing is completely unimpeded and continues exactly as when he is lying in the dorsal position. Failure to do this may have grave physiological consequences. One has only to lie for a very short time in the cerebellar position, with one's weight supported equally on pillows under chest and abdomen, to experience considerable embarrassment. Normal respiratory movements are impossible and inspiratory expansion must either occur by lateral abdominal movement, or at each inspiration the whole weight of the trunk must be raised. An anæsthetised patient placed in such a position suffers much distress. Respirations become embarrassed and laboured, and congestion gradually ensues, being greatest in the elderly and obese.

To quote extreme cases I have seen three patients whose colour became gradually worse, and who finally were deeply cyanosed even when breathing adequate amounts of pure oxygen up and down wide-bore tracheal tubes. All had pillows under chest and abdomen on which their weight was supported; all returned to normal colour within two minutes of being turned over to a dorsal position. The most reasonable physiological explanation is that under these conditions there is a decrease in the normal negative pressure in the thorax, so that blood is no longer returned to the heart at its usual rate and in its usual volume.

Ryan (1932) reported a similar case—a girl of 14 with a high spinal tumour. She was anæsthetised and turned on to her face, a sandbag being placed under her sternum. She became cyanosed and died within half an hour.

Short of these extreme cases, any patient badly supported and prevented to any extent from making his normal type of respiratory movement will suffer cerebral congestion to a greater or lesser degree.

METHOD

The technique we use may be summarised:—

Premedication: 1½ hours before operation omnopon gr. 1/3, scopolamine gr. 1/300; ½ hour before operation ½ dose of avertin, followed after 10 minutes' interval by more if necessary.

Induction by nitrous oxide oxygen as soon as narcosis is complete.

Introduction of Magill tube carefully smeared with special lubricant, preferably through the mouth so as to ensure that none of the lubricant is rubbed off in passing down the nose. The mouth is packed with vaseline gauze, and the nostrils are plugged with wool. Maintenance with 20–25 per cent. oxygen nitrous oxide mixture.

Position: If a cerebellar approach is planned great care is taken to support the patient in such a way that he breathes in his normal manner, which has been observed previously.

Local anæsthetic: The operative area is infiltrated with 1 per cent. novocain and 1/210,000 adrenaline.

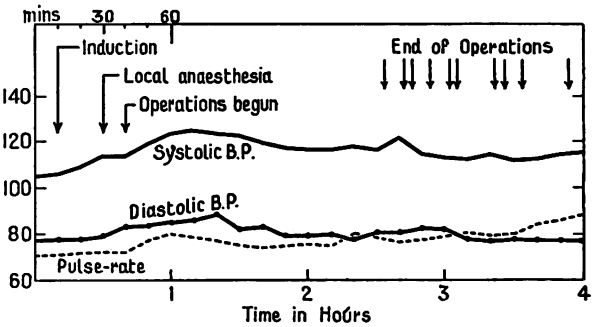

FIG. 2.—Composite chart of 10 neurosurgical cases.

Four theoretical advantages of local anæsthesia have been mentioned—in practice three of these are not very real.

First, the patient's general condition is not appreciably altered by the administration of this anæsthetic. Fig. 2 is a composite chart of our last 10 neurosurgical cases. The readings of blood pressures and pulse-rates at the start of the operations approximate quite closely to those that would be obtained during sleep—the ideal at which we aim. The continued low pulse-rates are noteworthy, and a striking tribute to modern operative technique.

Secondly, the reduced blood loss is of course a fact, and for this reason we infiltrate the operative area with novocain and adrenaline.

Thirdly, the previous administration of nitrous oxide oxygen does not obscure the immediate post-operative clinical picture. Every patient on leaving the table is still to a greater or lesser extent under the influence of narcotic drugs. There is no sharp contrast between a conscious patient who has had a local, and an unconscious one who has had a general anæsthetic. On the contrary, and especially if the operation has been a lengthy one, the patient who has been given gas-oxygen may be much more conscious than the one who has not. This is because in any case lasting four or five hours, at least one further dose of some narcotic has to be given if the patient is not under general anæsthesia. On the other hand the patient having gas-oxygen receives no further medication, however long the operation may last.

Finally, post-anæsthetic vomiting is really so rare that it may be disregarded.

SUMMARY

The advantages of local anæsthesia for intracranial surgery are more theoretical than real.

Complete control of a patient throughout any neurosurgical operation can only be obtained by some form of general anæsthesia.

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Nitrous oxide oxygen is the anæsthetic of choice, providing care is taken to avoid any trace of cerebral congestion. There are three possible causes of cerebral congestion under this form of anæsthesia :—

(1) Insufficient percentage of oxygen. This can be overcome by heavy premedication.

(2) Mechanical respiratory obstruction, gagging, straining, coughing, or a pseudo-asthmatical attack—all of which can be prevented by the use of a wide-bore tracheal tube lubricated by a special ointment.

(3) A faulty position of the patient which hampers his normal respiratory movements.

I would like to thank Mr. Geoffrey Jefferson for his unfailing advice and helpful criticism and for the use of his abundant clinical material.

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Clinical and Laboratory Notes

URTICARIA DURING BLOOD TRANSFUSION

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URTICARIAL reactions during or after transfusion are definitely rare. Considering the number of transfusions performed, and the number of people who develop urticaria after taking particular kinds of food, one would expect allergic phenomena to occur more often while blood is being given. We have been unable to trace any cases of such a nature recorded in this country but a few have been noted abroad.

Reaction phenomena, especially rigors, used to be relatively common after transfusions and are not necessarily disadvantageous (Stewart and Harvey 1931). They can be considerably diminished by faultless technique both during the transfusion and in preparation of the apparatus and reagents. Incipient coagulative changes have been incriminated, and also the allowing of the blood to cool below the temperature of the body.

Böttner (1924) in an excellent description raised the question of an anaphylactic interval following transfusions. He observed vasomotor disturbance, dyspnœa, perspiration, and diarrhœa after an infusion and was led to experiment with guinea-pigs using citrated blood given subcutaneously, intraperitoneally, and intramuscularly. His observations demonstrated a period lasting 21–23 days during which the animal was abnormally sensitive to further transfusions. He made use of the guinea-pig because, according to Pfeiffer, the guinea-pig is 400 times more sensitive to anaphylactic phenomena than man. Böttner concluded that repeat blood transfusions should not be done during the anaphylactic interval.

Duke and Stoffer (1923–24) describe anaphylactic phenomena following transfusion of blood in a case of pernicious anæmia. The patient had been given 1000 c.cm. of citrated blood, but after this rather large amount she was considered still anæmic, and further transfusion, using another donor, was started. This was immediately followed by a severe collapse with rapid onset of coma, but recovery took place under adrenaline therapy. Subsequently skin reactions were investigated and the patient gave a strikingly positive result to milk. The second donor had partaken of milk beforehand. In doing transfusions these workers now inject a small amount (1–2 c.cm.) of donor's blood into the vein of the patient to detect any possible anaphylactic reaction before giving the full transfusion.

It is to be noted that Duke and Stoffer do not state whether the two donors were compatible with each other as well as with the patient. This is very important, and apt to be forgotten.

Brem and co-workers (1928) produce further evidence that reactions may be due to the taking of food by the donors beforehand. They report severe reactions, accompanied by hæmoglobinuria when the donor had had a heavy meal of beefsteak before the transfusion. They now use fasting donors and in the case they describe an overnight fast seemed to suffice.

The patient in our case was a woman aged 45 of rather plethoric and flabby appearance in whom hysterectomy was necessary because of metrorrhagia. Hæmorrhage had been copious for some time; the hæmoglobin was 39 per cent. and the red cells 2,700,000 per c.mm. On confinement in bed the hæmorrhage decreased and the patient considerably improved. This improvement however was followed by a severe and prolonged hæmorrhage and it was deemed advisable to proceed with a transfusion before hysterectomy. The patient was Group A (Moss 2) and the compatible donor Group O (Moss 4). The donor was an obliging relative. At the transfusion making use of the direct method all went well till about 300 c.cm. had been given and the donor began to feel faint. Immediately afterwards the patient complained of itching of her head and neck and of being rather hot. The transfusion was continued as the patient's pulse showed no material increase and the condition of the donor was fairly good. There followed in the patient an intense erythema which appeared to start in the head and spread downwards over the entire body. This erythema was followed by urticarial weals. The larger were fully 2 cm. in diameter, and there were many smaller. Profuse perspiration appeared. There was slight dyspnœa and the pulse-rate increased. On the appearance of the urticaria the transfusion was stopped. The condition responded rapidly to adrenaline injections.

Böttner (1924) describes similar sequelæ in his case: "the patient became flushed and the skin over the entire body reddened like a crab. The patient observed that she had the feeling of blood running out of her pores. After this there was the sensation of heat and singing in her ears, vomiting, perspiration, evacuation of pultaceous material and exhaustion; these were followed 45 minutes later by a severe rigor." Complete recovery had taken place next day.

The transfusion in our case took place at 11 A.M. After a few minutes' rest the donor completely recovered and we learned that in order to fortify himself for the event he had gone the previous evening to a neighbouring town and had had a meal of cockles. This meal had taken place about 10 P.M. On the day of the transfusion, in view of the fact that he had to come a considerable distance, he had a light breakfast of tea and toast.

On returning to the patient we were informed that she had never been able to take any type of shell-fish. If she did so the event was immediately followed by a rash. Next day she showed in her urine a slight trace of albumin but no hæmoglobin or blood-cells. Her pulse-rate did at the time increase, but there was no appreciable rise in

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temperature that evening. No rigor followed and the operation was duly performed on the following day with an entirely uninterrupted recovery.

On admission the differential count of her white cells had shown 10 per cent. eosinophils—on after-thought strongly suggestive of protein hypersensitivity. The day after the transfusion the eosinophils were 1 per cent. and 23 days later 2 per cent. In Böttner's case 3 days after transfusion the eosinophils were 3·5 per cent. and 7 days later they were 1·5 per cent. but none were found six months later. In a second case he observed 16 per cent. eosinophils.

In the case described direct matching of the patient's serum with the donor's corpuscles had been done before the transfusion. The small amount of citrate used (about 3 c.cm.) to lubricate the syringe could scarcely be a factor in the production of the urticaria. Brem, Zeiler, and Hammack (1928) state that an overnight fast is sufficient, but apparently this does not hold good for cockles.

Considering the number of transfusions given it is surprising that such a sequence of events is not more often met with; and it will be extremely difficult to eliminate, especially in emergency transfusions where the recipient may be well beyond the stage of fruitful cross-examination. The intravenous injection of a small amount of the donor's blood may not provide any evidence. We believe that the early appreciation of the condition with immediate cessation of the transfusion and the availability of adrenaline are the essentials. The case described was apparently a fairly mild one.

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INVESTIGATION OF THE SOURCE OF INFECTION IN A CASE OF TYPHOID FEVER

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THE following case illustrates the well-known difficulties of investigating sporadic cases of typhoid fever.

The patient, who was first seen at the eighth day of disease, had a severe attack, the diagnosis being confirmed by blood culture and by positive agglutination tests to *Bacillus typhosus*. In searching for the mode of infection the usual inquiries and tests were made but without result. The water-supply was from a chlorinated source; the milk was bottled and sterilised; and the patient, who was a working-class woman, had not eaten any fresh vegetables, and took a very simple diet. She lived an isolated life, and examination of the few contacts was negative.

The only unusual article of diet which she remembered to have taken was two whelks bought about a fortnight before the illness from a stall in the market-place. Ten persons, including three in the patient's family, were known to have consumed whelks from the same stall, and all of these remained well. It was hard to trace other purchasers, for they came from a very wide area. As soon as the clinical diagnosis was confirmed bacteriologically, practitioners and medical officers of health of surrounding districts and of those known to receive supplies of these whelks were informed. No other cases, however, were reported.

Five samples of whelks were examined bacteriologically with negative results, and this conformed with expectation for the whelks had been fished from a whelk-bed in seven fathoms of water eight miles out at sea. On landing, they were said to be immediately transferred to boilers and boiled for three minutes.

What seemed to be quite an unnecessary sixth sample of whelks was forwarded to the Fishmongers' Company, analysed and examined by the "Long" method (Houston), by Prof. John Eyre, who kindly allows me to reproduce his report.

(1) Total number of organisms viable and capable of development upon gelatin at 22° C. per whelk. (Uncountable; plates completely liquefied at three days.)
(2) Total number of organisms viable and capable of development upon agar at 37° C. per whelk: 100,000,000.
(3) Microbes of indication: *B. coli*, 100,000 per whelk; streptococci, 10,000 per whelk; spores of *B. welchii*, 1000 per whelk. Pathogenic microbes: careful search was made by cultures on selective media (nutrose and glucose iron bismuth sulphite), but no members of the typhoid or paratyphoid groups could be detected.

Prof. Eyre's comment was: "Despite my failure to isolate any pathogenic bacteria the enumeration of the 'microbes of indication' gives such clear evidence of sewage pollution as to render these shellfish totally unfit for human consumption."

It will be seen that *B. typhosus* was not isolated; but as other paths of infection could be eliminated with reasonable certainty, strong suspicion rested on the whelks. This suspicion increased when it was found that (unknown to the local authority concerned) the fishermen were in the habit on their homeward journey from the whelk-beds of placing the whelks into string bags, and when they arrived at port of giving the whelks a short rinse in the harbour water. This was in order to remove particles of mud which adhered to the shell of the whelk, the mud having been derived from the mud-bank which was the whelk-bed. The harbour water was polluted by sewage from a small number of houses; though most of the excreta of the population was collected in the form of night-soil, a few ancient drains were discovered. Pollution would also occur from surface water on the land from excreta of animals, and this might account for the heavy infection of the water by *B. coli* and other "microbes of indication."

There can be little doubt that originally the whelks were clean, living as they do at a depth of fifty feet eight miles out at sea. It is probable that they were "thirsty" after being caught and kept out of water some hours, and that when they were placed again in harbour water, even during a short rinse, they absorbed water. Organisms from polluted water would be drawn into the interior of the whelk and escape death from the customary three-minute boiling. Samples of whelks from various boats, washed in the harbour, washed in the sea, and washed in fresh water, and also boiled and unboiled, were analysed, and it was found that only those whelks from two boats which landed near a pool which was not cleansed by the tide until half-flood, were contaminated. Those rinsed in this pool were contaminated both before and *after* boiling.

As a result of this case, whelks are not allowed to come in contact with the harbour water in any way. On landing they are placed and cleansed in new clean water tanks, after which they are boiled for five minutes. This rule should provide another example of a path of infection being closed, by prevention of contamination of a foodstuff by organisms of human sewage.

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MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF DISEASE IN CHILDREN

A MEETING of this section was held on Jan. 28th, with Mr. T. TWISTINGTON HIGGINS, the president, in the chair.

Status Lymphaticus

Dr. ALAN MONCRIEFF read a paper on the diagnosis and treatment of thymic enlargement in infants with special reference to clinical evidence of so-called status thymicolymphaticus. He had been observing 12 young children (4 of whom were shown) presenting various symptoms that seemed to be associated with enlargement of the thymus glands as shown on X ray examination of the thorax. In this country the condition termed status thymolymphaticus was out of scientific favour; M. Greenwood and W. W. Woods, who had greatly clarified the controversial aspects of the subject by a statistical approach, had dealt only with pathological material, since in their view the condition could not be diagnosed during life. The careful pathological report of M. Young and H. M. Turnbull was also concerned with post-mortem material. Since the publication of these papers, however, radiological technique had improved sufficiently to give an indication of the size of the thymus during life. Moreover, such size could be varied to some extent by treatment, and after treatment certain symptoms disappeared or were altered. It seemed fair therefore to protest gently against the sweeping implications of the title of a leading article in THE LANCET (1931, 1, 593) called "The end of status lymphaticus." Dr. Moncrieff agreed with S. Wright that the whole subject needed further investigation.

Of his 12 patients 10 were boys and 2 girls—a male sex dominance which others had noted. Symptoms had occurred before four months of age in all except one in whom "attacks" began at three years. The principal symptoms were: stridor only (5 cases), syncope and dyspnœa (3), head-retraction, one also with syncope (2), cyanotic attacks (1), fits (1), and dyspnœa (1). In one patient infantilism was also present. All the patients showed an enlarged thymus on X ray examination, whereas radiography of a number of normal children from a welfare centre had shown no similar thymic enlargement; enlarged thymus was not a common chance finding in children examined for disease of the heart or lung.

One of the five children with stridor, whose symptoms had started at four months, had had two remissions when seriously ill with diarrhœa and sickness before the age of 3½ years. Possibly dehydration which, it was recognised, might reduce the size of the thymus, had relieved pressure temporarily of a gland shown subsequently to be enlarged. Dr. Moncrieff thought that thymic stridor might explain some cases of so-called "congenital laryngeal stridor."

The cases with attacks of syncope and dyspnœa were most interesting.

The first had been admitted to hospital at six weeks for head-retraction, but no evidence of meningitis could be found. Later the child had attacks of going blue, the limbs becoming stiff, and the head being thrown back for about four minutes several times a day. When he was last seen some two months after radiation treatment there had been no more attacks.

The second child, who had been seen at intervals over three years since he was a day old, had had attacks of cyanosis, then curious fainting attacks during feeding, and later attacks of shortness of breath. These symptoms had all ceased since radiation treatment at the age of fifteen months, and the thymus, which had been large, had diminished.

The third child had been said to have had a fit when ten weeks old as he had been found unconscious. Since then he had had several attacks, going blue, breathing rapidly but shallowly and going limp. The child did not sleep after the attacks which lasted half an hour. Since treatment over a year ago there had been just one attack recently when the child had a cold. Again the thymus, which had originally been large, had diminished after treatment and was still small.

The fourth child began to have turns in which he went pale, panted, and "looked as if he were going to fall down" at the age of three. No cause could be found for the infantilism which was also present. Radiation treatment of the large thymus was followed by slight decrease in size and freedom from attacks for eight months when the attacks recurred and further radiation given.

There had also been three other cases without stridor. One had been thought at three months to be epileptic, having attacks lasting a few seconds several times a day and at night when his eyes rolled and his head shook. Bromides had not affected the attacks but in seven months since radiation treatment there had been no more. A case with dyspnœa had been free from symptoms after repeated treatment, while another with head retraction only had not been improved. The third child, who had been found unconscious at the age of ten weeks, had presented the most alarming symptoms of all. It was possible that such an attack was connected with the not infrequent tragedy in which a previously healthy infant was found dead in a cot or perambulator without any adequate cause being discovered. To some coroners and pathologists the existence of an enlarged thymus in such a case justified the diagnosis of "status lymphaticus," but these were just the circumstances which the school of Greenwood and Turnbull criticised. Dr. Moncrieff felt compelled to accept the connexion between the symptoms and the enlarged thymus, since a decrease in the size of the thymus affected by radium had brought about a cessation of all attacks for over a year. A slight exaggeration of the symptoms would possibly lead to a fatal termination. For such cases the prompt recognition of the nature of less serious attacks and their treatment by radiation of the thymus was so important.

It was difficult to accept pressure as the sole cause of the symptoms, although it was tempting to imagine that pressure on the vagus or big vessels of the heart might be present and suddenly increased by venous congestion caused by crying, choking, coughing, or breath-holding. The alternative was to assert that excessive internal secretion from the thymus antagonised the cortical secretion of the adrenals. Kemp had elaborated this theory, but Dr. Moncrieff feared to withhold radiation while trying out cortical adrenal hormone.

The radiation treatment in his 12 cases had been carried out by Dr. B. Windeyer with X rays or radium, and by Dr. Bertram Shires by means of a "radium bib."

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MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES

AT a meeting of this society on Jan. 28th, with Dr. H. M. HANSCHELL, the president, in the chair, Prof. J. F. A. ALBERT BESSEMANS, director of the institute of hygiene and bacteriology of the University of Ghent, Belgium, gave an address on

Antisyphilitic Hyperthermy Produced by Physical Agents

His work on the effect of heat on syphilis began in 1926 when it was found that *Treponema pallidum* in emulsions and cultures was destroyed at temperatures that were compatible with life in man and higher animals. His early work was carried out with rabbits infected with strains of treponema isolated in Ghent, the persistent infectiousness of which was shown by an unfortunate accidental inoculation and infection of one of the assistants in the institute at Ghent two years after the time of isolation. Methods of applying heat included hot-water baths; hot air; hot paraffin baths and packs; luminous and infra-red rays; medium, short, and ultra-short wave radiations; and finally hot-air chambers with and without electro-magnetic induction. Temperatures were measured by thermocouples and mercury thermometers, or (in the presence of electric or electromagnetic waves) by thermometers made of quartz and filled with benzene or with mineral oil. Certain fundamental facts were established concerning the death-time in vivo of *Treponema pallidum* in testicular syphilomata of rabbits and in the superficial lesions of early human syphilis. One hour at 42° C. (107·6° F.) or two hours at 40° C. (104° F.) brought about immediate or gradual death of treponemata, which first became avirulent, as shown by the failure of inoculation by transfer, and then became immobile. All treponemata then disappeared from the lesions, which healed. The rapidity of this sequence varied with the height and duration of the temperature. In some cases the effect was delayed for several days, indicating stimulation of the defence reaction of the animal.

Early lesions could also be healed or made non-infectious by local application of heat. The development of syphilitic lesions could sometimes be prevented by heating rabbits' testicles during the incubation period after inoculation. A second fundamental fact was that treponemata found in the popliteal nodes of the infected rabbit were much more resistant to heat, requiring, in some cases, 60 minutes at 46° C. (114·8° F.) before sterilisation. Again, this effect might be delayed for several weeks. Treponemata in rabbits' testicles during the incubation period following inoculation, and others in the brains of infected mice with no clinical signs of infection, had shown similar ability to resist heat.

Prof. Bessemans showed slides illustrating the effect of heat in healing the external lesions of human syphilis. He referred to experimental work by others who failed to confirm his results: Levaditi had treated infected animals in a short-wave electro-magnetic field with inconsistent results, but he had neglected to measure tissue temperatures accurately. Giovanni Truffi reported that *Treponema pallidum* remained virulent when passed for one hour through the bodies of pigeons which were stated to have a body temperature of 42° C. From this the deduction had been drawn that rise of temperature is not the sole cause of the action of malarial therapy and of pyretotherapy in general. These results could not be confirmed at Ghent and experimental work had shown much local variations of temperature of different parts of the bodies of pigeons and other birds, in some instances from 35° to 42° C. Treponemata might thus lodge in cool parts and retain their virulence.

It was clear that heat was the sole common, and most important, factor in all methods of hyperthermy. If a rabbit with a testicular syphiloma were immersed in a hot bath, given definite conditions of temperature and time, the lesions would heal. If the animal developed high fever and the testicles were prevented from coming into contact with the water by retention within the abdominal cavity or by other means involving exposure to cool air, the syphiloma would heal in the first case but not in the second—indicating that healing was due to heat and not to any other factor. Under experimental conditions the temperature of lesions, influenced by air temperature or other factors, varied greatly. This difficulty could be overcome by insulating these lesions against heat-loss by covering them with cotton pads. The increased resistance to heat of treponemata in the lymphatic system of rabbits persisted independently of the method of hyperthermy and the type of radiation. Again the important factor was the temperature of the lesion. In the human subject syphilitic lesions did not heal, nor were treponemata adversely affected as the result of any heating methods, if a sufficiently high local temperature was not obtained. For this reason the exposure of lesions to an intense electric field, sufficient even to cause burning of the superficial tissues, had failed to produce treponemicidal effects. Experiments in vitro with an emulsion of an Ehrlich's mouse sarcoma, with bacterial cultures, and with guinea-pig's blood rich in trypanosomes had shown that sterilisation could be achieved with short or ultra-short waves, but not when the test-tubes were air- or water-cooled.

There was a considerable variation in the temperature of the cervix uteri in women treated with local diathermy, depending upon the positions of the electrodes. Hence the fundamental importance of *continuous* measurement of tissue temperatures during treatment was clear.

In Prof. Bessemans's opinion heat was one of the most important, though perhaps not the sole, factor in the beneficial effect of malarial therapy upon neurosyphilis. The original work of Neymann and Osborne in 1927 was based on this theory, and their results, and those of others who treated general paretics with machine-produced fever, had proved the truth of this assumption. The end-results were similar whether such patients were treated with diathermy, short-waves, or external heat provided the temperatures were sufficiently high and prolonged. *Treponema pallidum* was very changeable and adaptable, and there were obscure biological problems to be solved before the exact mechanism of antisyphilitic fever therapy was known. In one case a portion of cerebral tissue was removed from a living paretic and many mobile treponemata were seen in the dark field. An emulsion of this brain substance was injected immediately into the testicles of a number of rabbits but no transfer of infection resulted. On the other hand, treponemata found in the brains of infected mice without external signs of syphilis were highly infectious.

Syphilitic rabbits had been treated with the combination of fever and antisyphilitic drugs to test the theories of Simpson and Neymann that the combined therapy was more effective than either method alone. Six were treated with fever and arsphenamine, 5 with the drug alone, and 5 with fever alone. Lymph-gland transfer into the testicles

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of other rabbits gave 2 positive results in those treated with arsphenamine and 2 positive in those treated with fever. There were no positive transfers from those animals in which the combined treatment was used. Serological tests had proved valueless in treating rabbit syphilis since a high proportion of paradoxical and misleading results were found.

The discussion was opened by Dr. A. BECK, who described some results obtained from heating syphilitic mice in a hot-air chamber. Because the mice tolerated this treatment badly the successful experiments were few in number but seemed to indicate that *Treponema pallidum* in the brains and lymphatic tissue of mice is more resistant than the same organism in the external lesions of rabbits and of man.

Other speakers discussed the clinical application of Prof. Bessemans's experiments and referred to the increasing importance of artificially induced fever as an additional method of treatment in various stages of human syphilis.

SOCIETY OF MEDICAL OFFICERS OF HEALTH

A MEETING of the fever hospital medical service group of this society held on Jan. 28th, with Dr. J. A. H. BRINCKER in the chair, was given to a discussion on the

Prevention and Treatment of the Enteric Diseases

Dr. ANDREW TOPPING, in opening, said that the ætiology of these diseases did not seem to be understood by the public or even by the medical profession, to judge from the recent happenings at Croydon. He wished to emphasise that typhoid fever always arises by the direct or indirect contamination of the proximal end of one person's alimentary canal from the distal end of another's. He agreed with Prof. Greenwood that water must be presumed to be guilty until proved innocent, but too great a concentration on water might allow the real criminal to repeat his offence. Infection by milk and milk products could be prevented by efficient compulsory pasteurisation. Secondary infection of the staffs of fever hospitals was not uncommon in spite of their training. He quoted a case of a nurse who had become infected by eating a grape belonging to a patient.

In non-epidemic times three things were particularly required. First, the public must be educated; they should be told, for example, that diphtheria and scarlet fever are far more important causes of death than enteric. Secondly, coöperation with the local doctors should be continuous and not reserved for an emergency; they should be accustomed to use the laboratory facilities provided and to call the medical officer of health or his specialists into consultation in cases of fever of doubtful origin. Thirdly, the Croydon outbreak had shown that the medical officer of health must make himself responsible for the sanitary control of the water-supplies and the sewage. It seemed clear also that more legal powers were required for the control of food-handlers. When an epidemic had actually broken out publicity was often a two-edged weapon. On the question of immunisation Dr. Topping did not propose to rush in where eminent bacteriologists had—if not feared to tread—at least failed to keep in step; but his personal opinion was that active immunisation of the community was unjustified in the face of a water-borne epidemic.

Dr. E. W. GOODALL, who was prevented by illness from taking a personal part in the discussion, submitted a paper embodying his experience of the treatment of enteric fevers. How long that experience has been was shown by the fact that he studied the cold water treatment at the London Fever Hospital in 1887–89. He had given up the more drastic versions of this treatment and now preferred tepid water baths. He thought that the greatest advance in the treatment of typhoid in his lifetime was the alteration from a starvation milk diet to a diet containing about 4000 calories a day. It was important to watch the stools to make sure that this increased diet was being digested. Dr. Goodall also discussed the recognition and treatment of perforation, which accounts for a third of the deaths from typhoid. He had previously described the signs and symptoms of 96 cases of perforation and he emphasised the dangerous stage of euphoria during which all signs of perforation except a rising pulse-rate may pass off. He had never satisfied himself that it was possible to detect a pre-perforative stage.

Mr. A. FELIX, D.Sc., described the advances made during the last two years in the serum introduced by him for purposes of treatment. He claimed that it was definitely specific, which Dr. Goodall doubted, and suggested that it might prove to be better given to all cases and not to selected cases only. It must be given early and was probably of little use in the third or fourth weeks. He suggested one-third of the prophylactic dose as the best dosage for treatment—e.g., a single dose of 30 c.cm. with the titre-strength at present in use. He greatly regretted the neglect of blood cultures as a routine means of diagnosis. The blood culture was often positive before fever appeared and the clot from the blood taken for a Widal might be used instead of more complicated methods which were not easy for the general practitioner. Dr. Felix also mentioned a new method for diagnosing carriers by an examination of the serum; he would be glad to be put in touch with any carriers in order to try this new test. One advantage of it would be that the results would be constant and repeated examinations would not be necessary as in the case of examination of fæces and urine.

Subsequent discussion largely turned on the difficulty in controlling carriers and made it clear that in typhoid, unlike diphtheria for example, there was no such thing as the non-virulent carrier.

LIVERPOOL MEDICAL INSTITUTION

A MEETING of this society was held on Jan. 20th, with Prof. R. E. KELLY, the president, in the chair. Dr. DONALD OWEN described shortly the signs and symptoms in a case of

Hyperostosis Frontalis Interna

together with the post-mortem findings. In the discussion that followed, Prof. HENRY COHEN said that although in recent years there had been renewed interest in the condition, it had been described by Morgagni, and was still referred to in Italy as Morgagni's endocraniosis. Its dominance in the female had been noted by Rokitansky, who sought to relate it with pregnancy and a curious deposit of flakes of bone that is occasionally found lining the skulls of pregnant women. But Greig had conclusively shown that this latter differed in nature and intensity from true hyperostosis frontalis interna. Stewart in 1928 had called attention to the association with obesity and advanced mental diseases though his cases were found in asylums. Greig in the same year had strenuously denied that there was any

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clinical syndrome whose presence would lead one to suspect the lesion. Morel's thesis in 1930 and Sherwood Moore's later paper described the relation of such symptoms as headache, progressive dementia, depression, obesity, fits, and visual disturbances—a widely embracing but indefinite group that would not permit of more than a tentative diagnosis. Attempts at correlating the symptoms with pituitary dysfunction showed the customary abandon of the professed endocrinologist. The cranial nerve palsies in Dr. Owen's case were the result of mechanical pressure. Prof. Cohen said that the possibility of associated cerebral disease must not be overlooked and he described one of his cases of hyperostosis, in which an early papilloedema and left hemiparesis were shown by ventriculography to be due to a right frontal tumour (glioblastoma), confirmed at autopsy six weeks later.

Mr. F. BERNARD CHAVASSE gave an account of recent advances in a paper on

Primitive Sight and Human Squint

He presented evidence that all sighted vertebrates had binocular vision, and that its ultimate refinement, bifoveal vision, was also present, and not only in a small class of the mammalia but in some birds, reptiles, and even fishes. An overlap was present in the binocular field of all vertebrates. No one had ever observed a purely monocular following movement in response to a purely monocular moving stimulus, even in the chameleon. It was safest to think of the "fusion" of the two uni-ocular patterns as a physical affair—a fusion in the appropriate oculo-somatic motor response. Similarly a psychological cause was not required to explain the comparative anatomy of the optic chiasma. It was a matter of effecting an economy in the neuronic architecture required to produce the appropriate movement. Flicker experiments afforded beautiful additional proof of what was already known, and to interpret such experiments from the standpoint of philosophical interactionism was physiologically gratuitous. The primitive vertebrate was as blind as a bat, which did not mean that it was unable to avoid obstacles, even in complete darkness, as a bat did. The hardly defined visual fields of the two structures, that in a translucent body were as yet hardly eyes, had if anything a vague total overlap. By the time the fields became defined, with a maximum overlap where the prey was, the eyes had become well endowed with muscles. These muscles were developed at first for the purpose only of keeping the eyes fixed, in relation to the panorama, in spite of movements of the head. So that from the first the two eyes were held in conjugate immobility under the influence of the compensatory (labyrinthine and neck) reflexes. On the conjugated bi-retina fell various light-stimuli, which came to be signals for the enhanced performance of reactions previously affected by non-retinal stimuli alone.

If binocular vision, Mr. Chavasse went on, so far from being the perquisite of man and the great apes, was so primitive as to be universal in the vertebrates, it followed that the developmental tendency towards it, manifest in the infant, should be very powerful. Its full development was ordinarily complete at the age of three, and at six or eight it had acquired a certain unconditional fixity. If an infant's eyes were forced into a position of squint they became confirmed in their faulty position by one or other variety of perverted binocularity. In the positive aspect of this—as distinct from the negative, amblyopic aspect—there developed, for instance, a perverted correspondence between the fovea of one eye and some eccentric spot, with very poor visual acuity, in the other eye. The perverted reflexes often became horribly perfected during the first three years of life and hopelessly fixed, at an early age, like devils in the reflex hierarchy. The eyes could be straightened for cosmetic or psychological reasons after this early age had passed. But the squinting eye was generally amblyopic; the ingrained perverted reflexes fought against the surgeon, tempting him into measures risking immediate or secondary divergence. There was as a rule no memory of normal correspondence to effect a physiological bond between the artificially straightened eyes; and it was much too late for such a bond to develop de novo. It was therefore often necessary, in cases not immediately relieved by occlusive and refractive methods, as well as in the great mass of unrecovered paralytic cases, to operate in very early childhood or in infancy, in order to give the ocular reflexes the chance of developing on normal lines before their place had been usurped by ineradicable perversions. Several operations had emerged, each designed to produce a particular effect, and all specially evolved for use in earliest childhood and infancy.

Mr. Chavasse, concluding, said that he did not presume to ask for the acceptance at its first presentation of a novel view of development of the ocular reflexes. But he did ask the general practitioner, who held the winning cards, to apply a principle on which all ophthalmic surgeons were in solid agreement—namely, the *instant* investigation of any case in which the suspicion of even an occasional squint had been aroused. Infants might squint from wind as adults did from anger, but as a rule the occasional glide meant that the great and ancient edifice of binocular vision was already rocking at its foundations.

Dr. C. ALSTON HUGHES contrasted the demands of the newer with the older methods of operating. He drew attention to the possibility of unpleasant subjective symptoms that might arise from hyperphoria following the more complicated newer methods, even when the cosmetic result was quite satisfactory.

WEIL'S DISEASE IN THE UNITED STATES

ACCORDING to a report drawn up by Dr. A. Packchanian, of the United States public health service (*Bull. Off. int. Hyg. publ.* 1937, **29**, 2350), the presence of *Leptospira icterohæmorrhagiæ* in the United States was first described in 1907 by Stimson, who found it in the human kidney and gave it the name of "*Spirochæta interrogans.*" Independent investigations by Inada and Ido in Japan in 1915 and by Heubner and Reiter in Germany in the same year showed this organism in Weil's disease. In South America human leptospirochætosis is widely spread and appears to be endemic, whereas in the United States only 18 cases of Weil's disease have been published in which *L. icterohæmorrhagiæ* has been found by examination with the microscope or by animal inoculation or both. In a large proportion of cases including an outbreak of 42 at St. Louis in 1933–35 the diagnosis was made on clinical grounds only. It is probable that some at least of the epidemics of infectious jaundice observed in the sixties of last century in connexion with the concentration of troops were outbreaks of Weil's disease, especially as the water-supply and disposal of waste water were at that time very primitive. Although it is hard to say just what proportion of rats are infected by *L. icterohæmorrhagiæ*, it is estimated that somewhat between 4 and 30 per cent. of the wild rats in the United States are carriers of this organism. They do not seem to suffer in any way from the infection.

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REVIEWS AND NOTICES OF BOOKS

Sex in Relation to Society

By HAVELOCK ELLIS. London: William Heinemann (Medical Books). 1937. Pp. 529. 12*s.* 6*d.*

IT is hard to realise that "Studies in the Psychology of Sex" were first published nearly thirty years ago. The present volume is a revised and abridged edition of the last in that series and, as the author explains in his preface, is intended not to supersede the original edition but to appeal to a wider public. The fact that material once restricted to medical readers can now be set before "all serious persons" is not without significance. The modern cry for candour has released a spate of books on sex and there might have been fewer bad or indifferent ones published had Dr. Ellis's served more often as a model for those about to write them. Sincerity and sympathy, coupled with encyclopædic knowledge, are among the cardinal virtues of a book which discusses motherhood, sexual education, nakedness, sexual love and morality, chastity, prostitution, marriage, the art of love, and the science of procreation. Few of us concerned with sex education, whether as parents or practitioners, can shake ourselves so free of early taboos as to be able to face this problem entirely without self-consciousness, but it is, happily, true that an increasing number can now view the question of sexual activity as something not to be settled solely by abstract considerations. These will echo Dr. Ellis's conclusion that every young person of either sex "must possess the knowledge necessary to form a judgment as to his or her own needs and be held responsible for the necessary self-control and self-discipline." That the individual should not require restraint from without but should learn, by a process of reason, to impose restraint upon himself is surely the test of sound social education. Dr. Ellis is rightly perturbed at the time-lag between increased knowledge and its practical application. Thus he deplores the lack of adequate legal provision of rest and economic independence for women at and around the period of pregnancy, the hesitant social approach towards the evils of prostitution and venereal disease, and the apathy of governments towards birth control. It is to be hoped that this book secures the wide public that it richly deserves.

Clinical Parasitology

By CHARLES FRANKLIN CRAIG, M.D., F.A.C.S., F.A.C.P., D.S.M., Professor of Tropical Medicine in the Tulane University of Louisiana, New Orleans; and ERNEST CARROLL FAUST, M.A., Ph.D., Professor of Parasitology in the Department. London: Henry Kimpton. 1937. Pp. 733. 40*s.*

THIS book contains, in concise form suitable for the clinician, the essential facts about the various animal parasites, both common and rare, producing disease in man. After a general introduction the subject matter is arranged in three main sections dealing with protozoa and protozoan infections, helminths and helminthic infections, and arthropods and human disease. A technical appendix provides notes on the collection, preparation, and identification of specimens, including the performance of practical laboratory procedures related to the subject—although weighing to four decimal places in order to prepare an iodine solution for the staining of amœbic cysts seems an unnecessary refinement. A good bibliography is supplied and a comprehensive list of representative parasites for study.

The material is arranged on the basis of zoological classification, which is clearly set out, and the descriptions of the parasites are excellent. The morphology, biology, and life-cycles of the various protozoa and helminths, and the pathological changes produced by them, are carefully and comprehensively discussed, and general information is given on their history, geographical distribution, and epidemiology. The arthropods are similarly treated, and their medical importance revealed by reference to the parasites transmitted by them; appropriate measures for their control are not ignored.

The sections on the symptoms, prognosis, and treatment of the various parasitic diseases are not as good as the rest of the book, and this fact perhaps raises a doubt as to whether they are not beyond its legitimate scope. For example, in the account of the therapy of sleeping sickness, there is considerable confusion between the various arsenical drugs. There are few physicians who would agree that Bass and John's method for the cultivation of malaria plasmodia "has proven useful as a control of the efficacy of treatment"; or with the statement that "so far as danger to life is concerned, the prognosis of infections with *P. vivax*, *P. ovale*, and *P. malariæ*, even if untreated, is excellent."

If the book is accepted primarily as a work on parasitology for clinicians the reader will have no ground for complaint, for he will find it a mine of sound and well-integrated knowledge, lucidly presented and illustrated.

Physiology of the Kidney

By HOMER W. SMITH, A.B., Sc.D., M.S. (Hon.), Professor of Physiology and Director of the Physiological Laboratories, New York University College of Medicine. London: Humphrey Milford, Oxford University Press. 1937. Pp. 310. 15*s.*

IN the twenty years that have elapsed since the publication of Cushny's well-known monograph, "The Secretion of Urine," a vast amount of work has been done to widen our knowledge of kidney function. Prof. Homer Smith has performed a valuable service in giving us here a critical review of this work, accompanied by a selected list of 500 references to papers published since 1920, some as recently as 1937. In retrospect it now seems that Cushny's filtration-reabsorption hypothesis, though attractive by reason of its mechanistic interpretation of kidney function, erred on the side of simplicity. This, however, in no way nullifies the value of his contribution which served as a powerful incentive to further investigation. But there can be little doubt, in the light of recent work, that the tubules excrete as well as reabsorb; moreover, far from reabsorbing the "ideal fluid" postulated by Cushny, they are able to reabsorb waste products such as urea in addition to substances, such as glucose, that are required by the body. The experiments that have been done in the elucidation of these problems are most clearly explained by the author. Those who left school before the days of urea-clearance tests may be glad to have the principles of this technique set out. It is satisfactory to have it confirmed (p. 133) that "the urea clearance is a very sensitive index of renal function and that it merits its widespread clinical popularity." To all students of renal physiology this

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work will be welcome as an exceptionally clear and up-to-date epitome of a complicated subject.

Diseases of the Heart

Second edition. By Sir THOMAS LEWIS, C.B.E., F.R.S., M.D., F.R.C.P. Lond., Physician in Charge of Department of Clinical Research, University College Hospital. London: Macmillan and Co. 1937. Pp. 297. 12*s.* 6*d.*

ALTHOUGH during the four years that have elapsed since this book first appeared advances have been made in diagnostic methods and in the treatment of certain forms of heart disease, many of these have scarcely yet won an accepted place in orthodox cardiological teaching. It is therefore not surprising that the text remains substantially unchanged. Certain modifications have been made in the discussion of the carotid sinus mechanism, and of chronic adhesive pericarditis. Sir Thomas Lewis said in his preface to the first edition that the book was to place at the disposal of students and medical practitioners the outline of his clinical teaching on diseases of the heart, and its publication has had much influence in standardising modern conceptions of heart disease. There is no better short treatise on the subject in English.

A Handbook of Ocular Therapeutics

Second edition. By SANDFORD R. GIFFORD, M.A., M.D., F.A.C.S., Professor of Ophthalmology, Northwestern University Medical School, Chicago, Ill. London: Henry Kimpton. 1937. Pp. 341. 18*s.*

Prof. Gifford's intention has been to set out concisely an account of those agents which he and other ophthalmologists have found of value in the treatment of ocular disorders. Besides achieving this he has devoted certain chapters to the discussion of the medical treatment of cataract, glaucoma, retinitis pigmentosa, and myopia. In the treatment of cataract he gives a well-balanced and unbiased survey of the part played by potassium iodide, subconjunctival injections of mercury oxycyanide, dionin, and other substances. He discusses recent work concerning the significance of the presence of vitamin C in the normal lens and aqueous, and its absence from the cataractous lens and aqueous. He is in agreement with many other ophthalmologists who believe that up to the present the medical treatment, apart from attention to arterio-sclerosis, diabetes, and foci of infection is unconvincing. Some interesting comments are made about adrenaline, ergotamine, pituitrin, and calcium in the medical treatment of glaucoma, and about superior cervical ganglionectomy, vitamins, and nitrites in treating retinitis pigmentosa, and epinephrin and thyroid extract for myopia. Many of these therapeutic agents the author has condemned as useless, whilst others which are still under trial and have not produced universally good results he mentions with a caution.

The scope of the book is wide. Chapters are devoted to equipment; anæsthetics, narcotics, and hypnotics; drugs, vitamins, and glandular extracts used in ophthalmology; specific and non-specific protein therapy; physical therapy, including sections on phototherapy, medical and surgical diathermy, X rays and radium; the treatment of diseases of the lids, conjunctiva, cornea, uveal tract, lens, retina, optic nerve and visual pathways, orbit, lacrymal apparatus, glaucoma, muscular disorders, and injuries of the globe. Technical descriptions of major ophthalmic operations have been omitted. Some may not share the author's enthusiasm for non-specific protein therapy in the form of milk injections or typhoid-paratyphoid, or his aversion to suturing wounds of the sclera for fear of further loss of vitreous. If this delicate operation is performed with suitable precautions, and the wound is properly closed, there is less likelihood of remote complications such as would occur in a weak ectatic scar or with the impaction or distortion of intra-ocular structure in its vicinity. The practice of using preparations other than silver nitrate as a prophylactic measure against ophthalmia neonatorum is here roundly condemned. In this country many ophthalmic surgeons prefer some substitute on various grounds, of which the chief is that corneal damage and even blindness have been known to follow instillation of silver nitrate drops after birth. The author's attribution of the symmetrical enlargement of the lacrymal gland in Mikulicz's disease to tuberculosis would be challenged by many authorities.

The illustrations are good, although here and there redundant (e.g., pp. 89 and 281). The book contains much sound practical advice and its production is admirable.

Traumatismes de l'oreille

By J.-A. RAMADIER, Oto-rhino-laryngologist, Hôpital de la Pitié; and R. CAUSSÉ, Oto-rhino-laryngological Assistant, Hôpitaux de Paris. Paris: Masson et Cie. 1937. Pp. 150. Fr.45.

ACCIDENTS to the ear are becoming more frequent under modern conditions of life, and the otologist should be familiar with their immediate and late results, for which he may have to take some responsibility. The authors of this work are quite right in believing that a monograph on the subject will be welcome, and the more so perhaps because their experience differs in many respects from that of British otologists. For instance, among the causes of rupture of the drum membrane they place the sudden increase of atmospheric pressure in a caisson, but they do not mention the much more common increase of pressure occurring in rapid aeroplane descents. They have found that rupture of the drum is usually followed by suppuration, with a greater incidence of mastoiditis and chronicity than in non-traumatic otitis; this gloomy outlook, one feels, probably dates from experience in the war, when most injuries were caused by explosions, for membranes ruptured by the indirect violence of a box on the ear or in aeroplane descents usually heal kindly. The authors give no description of plastic operations for the cure of traumatic stenoses of the auditory meatus. The most arresting chapter is that on fractures of the petrous bone, in which they lay stress on those "microscopic" fractures which may easily be overlooked both clinically and at post-mortem examination, and which may be the cause of infection reaching the meninges from a simple otitis years after the original injury. An account of gunshot wound follows, in which early operation is advised when the labyrinth is fractured. Concussion of the labyrinth is divided into two classes: one in which there are physical signs characteristic of damage to the vestibule and cochlea, and the other where there are no definite physical signs and normal or increased sensitivity of the labyrinth, the symptoms being due to disturbance of cerebral centres.

The book ends with a useful chapter on expert examination and medico-legal reports on injuries to the ear; it will be helpful to all who have to deal with these difficult and not uncommon cases.

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THE LANCET

LONDON: SATURDAY, FEBRUARY 5, 1938

MILK

THE attempt of the British Medical Association to convey to the public what is meant by the term "safe milk" is meeting with opposition. Having had little success in putting over its views on milk through the news columns of the press, the B.M.A. decided to offer a paid announcement informing the public that pasteurised or tuberculin-tested milk could alone be regarded as safe and recommending that all other milk should be boiled. Some newspapers and weeklies accepted it, others apparently did not. The *New Statesman and Nation*, in publishing the announcement, questioned the advisability of some of the B.M.A.'s wording but dissented from the view that the collective opinion of such a body should be suppressed because it might conflict with some other interest. In noting "this unusual reluctance to print an announcement from a responsible advertiser," on the part of the organs affiliated to the Newspaper Proprietors' Association, it says that it remains a matter of conjecture "whether the proprietors were influenced by the consideration that the Milk Marketing Board is financially a more important advertiser than the B.M.A., or whether it was felt that publication . . . would be contrary to the public interest." Comment in the *Spectator* and *Time and Tide* on the attitude of the daily press has been even more caustic.

The main issue is whether it is not in the public interest at the present time that people should be warned about the dangers of consuming milk that has not been either pasteurised, or derived from tuberculin-tested herds, or boiled. The fact that such a plea has often been the excuse for obscurantism is not in itself sufficient reason for discounting it. The elucidation of the problem may be found in the answers to three questions.

(1) Is the B.M.A.'s pronouncement scientifically justified?

(2) If it is justified, are there other disadvantages in the heat treatment of milk?

(3) Even if the answer to the first question is in the affirmative and to the second in the negative, will the public health suffer more from a possibly consequent decline than it would from increased consumption of milk which cannot be regarded as safe in the bacteriological sense?

To the first question there can be only one answer. From a careful analysis of the available data a committee on cattle diseases of the Economic Advisory Council,[1] of which Sir GOWLAND HOPKINS was chairman, concluded that, making all allowance for error, it was clear that bovine tuberculosis was responsible in Great Britain for many deaths—more likely to exceed than to fall short of 2500 each year—and for much serious illness. Though the numbers may be falling with the general decline of tuberculosis, this estimate has never been seriously challenged. The committee also furnished a list of recorded milk outbreaks of acute infectious disease during this century numbering 103 and affecting about 12,000 persons, which is recognised to be very far from complete. These statements merely epitomise what is the common knowledge of the medical profession and familiar to those members of the public who read their newspapers; there appears to be nothing in the announcement of the British Medical Association that is not in accordance with the facts. On the second point, the possible effect of heating on the nutritional properties of milk, an exhaustive survey by Sir WILLIAM SAVAGE, published in our columns four years ago,[2] showed that the destruction of vitamin C by heating, while it was real, was generally unimportant because the content of this element in any fresh milk was variable and often small. (Indeed he found that all milk in this country required vitamin-supplementation.) The effect on diffusible calcium was negligible. Cow's milk was demonstrated to be not quite the perfect food it is sometimes claimed to be, and the slight changes caused by pasteurisation were an insufficient argument for refusing to make it bacteriologically safe. These views were emphatically upheld by BENDIXEN and others in a contribution to the *Bulletin* of the Health Organisation of the League of Nations last June.[3] This group of workers was appointed to explore the subject by the Health Committee of the League and comprised Danish and British bacteriologists, a zoologist from Paris, and a representative of the Dutch dairying industry. Its report is authoritative. The contention that pasteurisation or any other form of heat treatment would seriously endanger the health of the community is now seldom heard in scientific quarters.

The third question is more difficult to answer. That milk is of special value as a food, especially for children, is universally accepted. The policy of the Government in extending the provision of milk for children, free or at reduced prices, is based on the recommendations of physiologists and other medical workers, although the official drive has no doubt been actuated to a great extent by the corresponding benefit to the milk industry. It is not unreasonable to suppose that the pronouncement of the British Medical Association might, for a time at least, react unfavourably on the publicly financed propaganda of the Milk Marketing Board and cause a decline in the consumption of milk. In this connexion it may be noted that this Government-subsidised propaganda is not a complete embodiment of the views of responsible bodies like the Minister of Health's Advisory Committee on Nutrition. In the popular document of this committee, entitled "The Nutritive Value of Milk," dated March, 1936, attention is drawn to the facts that milk is a medium through which disease may be conveyed

[1] Cmd. 4591. H.M. Stationery Office. 1934. 2s. 6d.

[2] *Lancet*, 1933, 1, 429 and 485.

[3] *Quart. Bull. Hlth Org. L.o.N.* 1937, 6, 371.

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to man, that perfectly healthy herds are relatively few, and that, where the ideal milk from such cows is not available, milk should be pasteurised or boiled. In their first report [4] they express the hope that the primary objective of the State will be to ensure a supply of *safe* milk for children and adults in increased quantity, and the opinion that this "largely increased consumption of *safe* milk" would be the greatest single measure toward improving the health of the rising generation. (The italics are ours.) Safety, however, as distinct from cleanliness, is not being emphasised in the publicity of the Milk Marketing Board or of the Central Council for Health Education in connexion with current health campaigns. It is not fanciful to suggest that a rise in the consumption of milk which is unsafe will increase the risk of tuberculosis and other infections to the community and that this danger may counterbalance any nutritional benefit. The Government seems to realise that the success of its policy depends on confidence in the purity of the milk-supply,[5] for it intends to introduce a Bill enabling local authorities, under conditions, to prohibit the sale in their areas of milk that is not either tuberculin-tested or pasteurised. Previous efforts by Glasgow and Poole to obtain such powers were not successful, and the legislature appears to require informing on the risks as well as the advantages of milk before it can be persuaded to take effective action. The safety of water-supplies has not been attained without the stimulus of public interest, and it has not been suggested that the prominence given to recent events in Croydon has been undesirable. The rousing of popular concern about milk seems to be equally necessary, even if it does cause a temporary fall in consumption.

ENDOCRINE TREATMENT OF THE CYSTIC BREAST

HORMONAL pathology is a young and vigorous branch of science. During the past few years our understanding of the interwoven mechanisms that govern the reproductive organs has rapidly advanced, and we have learned much about the origin of several obscure disorders. Disappointment is often expressed that such accumulating knowledge has not been of more help in treatment, but actually the known sex hormones already have an irreplaceable value as curative agents when they are used to reinforce a deficient natural output. One of the chief difficulties confronting the therapist in dealing with disturbances of internal secretion is to recognise excess or deficiency before the body has suffered seriously from it. Moreover, the activities of the different organs are so interdependent that it is not easy to predict all the consequences of an artificial disturbance of any one of them. For the present, we must adjust therapeutic methods to experience gained in the laboratory, but need not be completely dominated by such experience. We must be content to find the way slowly by trial and error.

These thoughts arise on reading a paper by DEAN LEWIS and GESCHICKTER [1] on endocrine therapy in chronic cystic mastitis. They recognise two forms of this condition—namely, cystic disease and adenosis—and they postulate an early indifferent stage common to both, which they call mastodynia or painful breast. This mastodynia, they find, may be treated successfully by giving œstrogenic hormone in doses of 10,000 international units twice weekly for several months, and the more advanced stage, adenosis, may also be cured in a similar way. The object of administering œstrogens is "to suppress the pituitary activity and to carry pathologic changes of the breast forward to a state of involution or fibrosis." At first sight the means used to this end may arouse surprise, and even consternation, for leaving aside the question whether chronic cystic mastopathy (as we shall call it) is a precancerous lesion, we are faced with the fact that œstrogens are generally supposed to *cause* (*a*) cystic mastopathy, and (*b*) mammary cancer—according to the evidence of the laboratory. LATHROP and LOEB in 1916, and C. F. CORI in 1927, found that spontaneous mammary cancer can be prevented in mice by removal of their ovaries early in life, and W. S. MURRAY in 1928 showed that mammary cancer can be induced in male mice of certain strains by grafting into them, when young, an ovary removed from a litter-mate—an observation since confirmed by DE JONGH and KORTEWEG.[2] These experiments prove that ovarian activity plays a large part in the ætiology of mammary cancer in mice. GOORMAGHTIGH and AMERLINCK [3] carried our knowledge a stage further when they found that a preparation containing œstrone, when injected repeatedly into mice, caused a condition comparable in all respects with "la maladie de Reclus"; and in one of their mice so treated a mammary cancer arose. Finally it has been demonstrated by LACASSAGNE,[4] and confirmed by others (BURROWS,[5] BONSER,[6] GARDNER et al.[7]) that cancer of the breast may be induced in mice, even in males, by the continued administration of several pure chemical œstrogens (œstrone, œstrone benzoate, equilin, equilinine, œstradiol benzoate). In the earlier stages of such administration these hormones cause changes in the mamma that seem comparable in every respect with the so-called chronic cystic mastitis of human pathology. In view of these experimental observations, it appears on the face of it somewhat hazardous to treat a condition, which is possibly caused by excessive production of œstrogens or excessive reactivity to their influence, by administering additional quantities. The problem, however, is not a simple one and cannot be solved by abstract reasoning alone.

[4] Advisory Committee on Nutrition. First Report. H.M.S.O. 1937. 1s. [5] Milk Policy. July, 1937. H.M.S.O. 2d.

[1] Lewis, D., and Geschickter, C. F., *J. Amer. med. Ass.* 1937, 109, 1893.
[2] De Jongh, S. E., and Korteweg, R., *Acta brev. neerl. Physiol.* 1935, 5, 1.
[3] Goormaghtigh, N., and Amerlinck, A., *Bull. Ass. franç. Cancer*, 1930, 19, 527.
[4] Lacassagne, A., *C.R. Acad. Sci., Paris*, 1932, 195, 630; *Amer. J. Cancer*, 1936, 28, 735.
[5] Burrows, H., *Brit. J. Surg.* 1935, 23, 191.
[6] Bonser, G. M., *J. Path. Bact.* 1936, 42, 169.
[7] Gardner, W. U., Smith, G. M., Strong, L. C., and Allen, E., *J. Amer. med. Ass.* 1936, 107, 656.

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LEWIS and GESCHICKTER dismiss the hypothetical danger of inducing cancer by their œstrogen therapy. They say :—

"In Lacassagne's experiments estrogen in excess of one millionth of the body-weight of the mouse was administered at a single dose, and the dose was repeated weekly throughout the life of the animal. A corresponding dosage in a patient weighing 50 Kg. would necessitate the administration of 50 mg. of crystalline estrogen at a single dose and the injections would have to be begun in early childhood and continued throughout life. The estrogen therapy used in chronic cystic mastitis is well below the amounts present in normal pregnancy. The safety factor in this form of therapy is therefore well within all reasonable limits."

Such an argument may or may not be convincing. Wide differences in their reactions to œstrone are shown among mice ; and to forecast the reactions of man on the basis of his weight would, we think, hardly be justified. In accordance with laboratory work, chronic cystic mastopathy must be regarded as suggesting either an excessive production of, or an excessive reaction to, œstrogens ; and this, as we have said, must lead to hesitation in giving additional supplies. Experiments show that the induction of cancer—whether by sex hormones, by X rays, by the compounds prepared by KENNAWAY and his colleagues, or by other chemical agents—is a lengthy process. LOEB (1919) found that, to be certain of preventing mammary cancer in mice, removal of the ovaries must be done in early life. In man, too, it is recognised that there is nearly always an interval of years between exposure to a cancer-producing agent and the appearance of cancer. It may be argued therefore that if a patient with chronic cystic mastopathy is likely to get cancer the harm has already been done in past years and will not now be accentuated by any further stimulation of the same sort ; and conceivably this is true. On the other hand it may be said that suppression of the activity of the pituitary, which LEWIS and GESCHICKTER describe as their aim, might be effected just as readily with testosterone as with œstrone ; and testosterone is free from suspicion of causing either cystic mastopathy or cancer. We are here, however, in a field where theoretical foundations may be found unsubstantial in practice. For example, at one time it appeared probable that the regular administration of testosterone to mice would prevent their developing mammary cancer, because, like œstrone, testosterone interferes with the output of gonadotropic hormones from the pituitary. This idea has not proved sound in practice. LACASSAGNE [8] found that testosterone, given in considerable amounts to mice from infancy onward, did not prevent the appearance of spontaneous mammary cancer nor of mammary cancer in response to œstrone. It is not known how far, if at all, testosterone would prevent cystic mastopathy in mice.

In discussing the hypothetical bearings of LEWIS and GESCHICKTER'S work we do not want to express any opinion about its field of usefulness ; that must await the judgment of time. Our object has been first to emphasise some laboratory experiences that at once are brought to mind by their paper, and secondly, to show that while these laboratory experiences cannot be ignored, they cannot be made the basis of any confident criticism, adverse or otherwise, of therapeutic practice. There is indeed reason to regard suppression of the activity of the anterior pituitary, by whatever means attainable, as the most promising prophylactic measure against cystic mastopathy and mammary cancer. In our issue of Jan. 8th Dr. CRAMER and Dr. HORNING reported that they have succeeded in preventing spontaneous cancer of the breast, in mice otherwise susceptible to this disease, by giving a preparation containing thyrotropic hormone, and this is a procedure that may well owe some of its effectiveness to an interference with the activity of the anterior lobe of the pituitary gland.

[8] Lacassagne, A., *C.R. Soc. Biol., Paris*, 1937, **126**, 385.

AN INVENTORY AND ACTION THEREON

THE United States public health service has just published the results of what is called a "national health inventory"—a systematic inquiry into the prevalence of sickness in the United States and the various agencies in operation against it. The inquiry, for which a grant of $4,000,000 was made by the Works Progress Administration, took the form of a house-to-house canvass in 1935–36 of 740,000 families living in 84 typical towns, large and small, and comprising about 2,660,000 persons. Twenty-three rural counties were also included in the inquiry. In this way a representative sample of the population was studied, and the particulars obtained afford, it is thought, an adequate basis for estimates that can safely be applied to the whole country. Similar surveys have previously been carried out in America—notably that made in 1921–24 in Hagerstown by the late EDGAR SYDENSTRICKER, the survey of the Committee on the Costs of Medical Care in 1928–31, and the Health and Depression study of 7400 wage-earners' families in 1933. But this inquiry was far more comprehensive, and is probably the most complete study of sickness prevalence yet made in any country.

From the facts elicited it is estimated that in the United States on an average winter's day about 6,000,000 men, women, and children are unable to work, or attend school, because of illness or accident ; that of these persons about 2,500,000 suffer from chronic disease, 1,500,000 from influenza, pneumonia, bronchitis or other respiratory diseases, and 500,000 from accidents ; that for every death reported there are on the average 16 cases of illness disabling for a week or longer ; and that on a per-capita basis every man, woman, and child suffers at least ten days' incapacity annually from illness lasting at least a week. As might be expected, the prevalence of disabling sickness was relatively much higher among the poorer members of the community. Persons with a total family income under $1000 per annum but not receiving relief experienced more than twice as much disability as those in the highest income

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group, and persons receiving relief three times as much. In the representative urban population studied, 40 per cent. were members of families with annual family incomes of less than $1000, 65 per cent. were in families with incomes of less than $1500, and 80 per cent. with incomes of less than $2000, and nearly half of the lowest income group had been in receipt of relief during 1935. It was found that the persons in the lower income groups, among whom sickness was most prevalent and who consequently were most in need of medical care, were precisely those who got least medical care. One of the most important conclusions that can be drawn from this inquiry is that the great majority of the people of the United States are unable from family resources alone to pay for adequate medical care in serious or prolonged illness. And 18,000,000 live in counties in which no hospitals of any kind exist.

Such are the outstanding facts concerning the provision of medical care—not in some poor backward country of the Old World but in the richest of all countries, a country with illimitable resources and with a people famous for enterprise, inventiveness, and energy. It is not surprising that there should be a rapidly growing feeling among the American people that something effective must be done to provide adequate health services for the nation. The problem is difficult, and requires for its solution the goodwill and coöperation of many interests, and especially of the medical profession. Guidance might naturally be expected from the representative organisation of the profession, the American Medical Association with its 150,000 members, representing every department of medical practice. In this country such guidance has not been lacking, and in its Proposals for a General Medical Service for the Nation the British Medical Association has placed definite suggestions before profession and public. The American Association, by contrast, seems to have concentrated too much of its energies on the destructive criticism of constructive proposals put forward from other quarters medical and lay. It would be untrue, however, to say that it has made no constructive suggestion. At a meeting of the Associations' board of trustees last December consideration was given to the situation, and it was noted, first, that "a varying number of people may at times be insufficiently supplied with needed medical service for the maintenance of health and the prevention of disease," and secondly, that "the means of supplying medical service differ in various communities." It was accordingly resolved :—

"That the American Medical Association stimulate the state and county medical societies to assume leadership, securing cooperation of state and local health agencies, hospital authorities, the dental, nursing and correlated professions, welfare agencies, and community chests in determining for each county in the United States the prevailing need for medical and preventive medical service where such may be insufficient or unavailable; and that such state and county medical societies develop for each county the preferable procedure for supplying the several needs, utilizing to the fullest extent medical and health agencies now available, in accordance with the established policies of the American Medical Association."[1]

But this resolution hardly seems adequate to the occasion. To expect that local committees of practitioners, earning a livelihood in the most exacting of all professions, should build up a system of administration for coping with the formidable task of providing the American people with the medical care they need is surely expecting too much. Such great expectations suggest unfamiliarity with the kinds of arrangement necessary for the administration of services required to meet great national needs. Perhaps now that the results of this inquiry have deeply moved public opinion in America the Association may be induced to try again.

ANNOTATIONS

THE NEW WESTMINSTER AT HOME

THE Westminster Hospital is rapidly taking form on its new site in the more populous part of the Royal borough. The ground space available is twice what it was on the old site, and with its 400 beds it is to be the finest small hospital in London. No one has as yet ventured to dispute that. The Coronation wing, now well forward, faces across the fair open space of St. John's-gardens a completed building containing those accessories of a teaching hospital, the schools for nurses and medical students. Both are, of course, also hostels: the nurses' school in large degree with its resident population, sisters, nurses, and domestic staff, running up to 300; the medical school with twenty bedrooms for resident medical officers, besides quarters for resident engineer and caretaker. Both schools are under the same roof and have in common their central heating and other services, with a kitchen which feeds all the students and also teaches the nurses their sick-room cookery, while all the bedrooms on both sides of the house are furnished and fitted alike. The medical school was in fact built with a substantial sum raised expressly for that purpose, and it is emphasised that no charge comes on the hospital funds for the furnishing and equipment of the students' rooms. The same emphasis is also laid on the fact that the really beautiful furnishing of the nurses' common-rooms has been made possible by anonymous gifts. Despite these disclaimers it seems fitting that a teaching hospital should advertise to the world its indebtedness to the nurses and medical students without whom it could not carry on. What can be done on so urban a site to ensure the elements of healthy living has been done. On the nurses' side there is an extensive terrace, admirable roof-gardens and games-rooms, the larger given up to badminton. On the medical side there are gymnasium, billiard-room, and squash-courts under the lecture theatre. While there may be no surprises about the lay-out of the nurses' home, apart from the care and thought that have been given to comfort and convenience, the medical school reveals throughout the educative purposes of its designers who have freely availed themselves of all that has appealed to them elsewhere as

[1] *J. Amer. med. Ass.* Jan. 15th, 1938, p. 212.

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suitable for a self-contained medical school of that size. The library and museum on the first floor are excellent; the main classroom on the second floor has an intelligent slope on it. The third floor and above are given up chiefly to the pathologist and his minions. If not in the hospital, at all events in the school, pathology is not to be considered a subject so much as an attitude of mind. The nurses' home is already in occupation, anticipating the formal opening by Queen Mary on March 1st. The medical school will be formally opened a little later by the Chancellor of London University.

RHEUMATIC CHILDREN IN LONDON

IN 1926, following suggestions by Sir George Newman, Dr. Poynton, and Dr. Gordon Pugh, a rheumatism unit with 60 beds was established at Queen Mary's Hospital, Carshalton, and it was proposed gradually to extend the unit system until treatment could be given for at least six months to all London children with active disease. In addition it was proposed to establish centres for supervision and early diagnosis, and organisations for the care of cases after their discharge from hospital and for the investigation and improvement of home conditions, the various branches of the scheme being under central control to ensure coördination between them. Progress with this scheme has been so satisfactory that the three doctors in charge of it think [1] there is little more to be done within the limits, that is to say, of present knowledge.

For acute and subacute cases 650 beds are now available, including 390 at Carshalton and 210 at High Wood Hospital, Brentwood, and there are 250 beds for convalescents. The first two supervisory centres were established at Wandsworth and Downham in 1928, and there are now 20 such centres, 10 equipped by the L.C.C. and 10 at voluntary hospitals. Children are supervised for at least two years after their discharge either at the supervisory centres, by the school doctors, or at hospital out-patient departments. Detailed reports are obtained on the home conditions of all children who receive institutional treatment, defects are attended to, and preference is given to applications from these families for accommodation at the Council's housing estates. The cases applying for admission to the units are selected, graded, and allocated by the supervising medical officer, Dr. C. E. Thornton, who dealt with nearly 2000 applications in 1935. When a child is discharged his case is again reviewed and a suitable school is chosen for him. At the County Hall a full record is kept of every child treated under the scheme and particulars of all children reported as rheumatic by school doctors are recorded in a special register.

In the rheumatism units provision is made, by means of hospital schools, for such education during the later stages of treatment as will enable a child gradually to renounce his rôle of invalid. The two main difficulties encountered in active medical treatment are the absence of any specific diagnostic test and the unpredictable behaviour of the disease. The degree of activity in the later stages has to be estimated from the patient's general condition, temperature record, and response to exercise. At High Wood it has been found that a raised blood sedimentation-rate usually indicates activity, though the test fails in chorea. The chief aim of treatment in the active stage is rest of body and mind for at least six months, good nursing and skilful handling being of more value in keeping the patient quiet and contented than hypnotics. Drugs play but a small part, though sodium salicylate is given when pain is prominent and aspirin at other times. Fever induced by intravenous T.A.B. vaccine has been used in some severe cases of chorea at High Wood, but calcium aspirin has now largely superseded this procedure. Relapses may frequently be anticipated by regular sedimentation estimations and by keeping a watch on body-weight and response to exercise. Their prevention is helped by the removal of septic tonsils when the rheumatism has been quiescent for several months, and by precautions against the spread of tonsillitis in the wards. The treatment of children with established heart disease can only be palliative, though, in the absence of failure, much good can be done by rest and graduated exercises.

[1] The Council's Rheumatism Scheme. By N. Gray Hill, A. G. L. Reade, and C. E. Thornton. Annual report of the L.C.C. for 1936. Vol. IV, Part III, p. 110.

FRACTURES OF THE PETROUS

IN their book on injuries of the ear, which is reviewed on page 325, Ramadier and Caussé draw attention to a class of fractures of the internal ear which they term "microscopic," because they may escape notice at post-mortem examination even with a magnifying glass, and only be revealed by histological or radiological examination of the petrous bone after its removal. The remote effects of these fractures may be dramatic. Clinically the patient has an injury to the skull in which a fracture may or may not be diagnosed, and is left with a dead internal ear with complete deafness and an inexcitable labyrinth. The line of fracture does not become well consolidated, so that a communication remains from the tympanum to the internal ear and to the prolongation of the subarachnoid space in the internal auditory meatus. Months or years later a simple otitis is rapidly followed by meningitis, and this without symptoms of inflammation of the labyrinth, which is already dead. The authors believe that in cases where an otitis is quickly followed by meningitis a history of head injury might often be obtained if it were sought for. Contrary to the usual opinion, then, a transverse fracture of the petrous bone involving the internal ear carries a worse prognosis than a longitudinal fracture which opens the tympanum and tears the membrane.

The indications for surgical interference in fractures of the petrous bone are by no means simple. In the French writers' opinion, when the fracture does not involve the labyrinth and there is no suppuration of the middle ear, there is no need to operate; if there is suppuration it is doubtful whether a mastoid operation will lessen the slight risk of meningitis due to injury to the dura mater in the line of fracture. If mastoiditis supervenes a radical mastoid operation should be done rather than antrotomy, in order to remove as far as possible suppuration of the fracture of the tegmen tympani, and this operation is also advisable in chronic suppuration. When the fracture involves the labyrinth, no operation is indicated if there is no suppuration, whether the drum has been ruptured or not. If otitis media occurs, the authors are in doubt whether to leave things alone, to perform a radical mastoid, or to combine this with a labyrinthotomy as advised by O. Voss.[1] The appearance of any meningeal reaction calls for a mastoid operation and, if a fracture of the labyrinth is confirmed at operation or by radiography, for labyrintho-

[1] Die Chirurgie der Schädelbasisfracturen, Leipzig, 1936.

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tomy. Owing to the likelihood of meningitis following even a mild otitis where there has been an old injury and a dead labyrinth, lumbar puncture should be done on such patients if there is the slightest sign of meningeal irritation, followed, if the findings are positive, by mastoidectomy and labyrinthotomy. In view of this danger of subsequent meningitis, Voss advises labyrinthotomy in all cases of transverse fracture of the petrous bone.

CLINICAL RESEARCH ON SHOCK

THOUGH important fundamental work on shock has been done on animals, it is dangerous to argue too closely from them to man. Clinical research is here at least as necessary as experiment and it is yielding useful data. The behaviour of the skin capillaries for example has been studied by Szanto [1] using Herzog's method, and he reports that after major abdominal operations the blood pressure in these capillaries falls concurrently with the arterial pressure. The fall was measured as early as 4–6 hours after operation and persisted for about 3–5 days. The syndrome of shock as it develops in rather different circumstances—i.e., in therapeutic hyperpyrexia—has been investigated by Kopp and Solomon.[2] They found that a reduction of plasma volume took place with concentration of the red cells. The onset of shock was sometimes preceded by a rise of blood pressure and pulse-rate suggesting an increased output of adrenaline. Altered capillary permeability was shown by œdema of the hands. Fluids given by mouth were insufficient to maintain the plasma volume, intravenous fluids being required, and impaired absorption of fluid from the bowel seemed to be a contributory cause of the shock.

An excellent historical survey was given by Sir Stanton Hicks [3] in his Hamilton Russell memorial lecture at Melbourne last year, in which he spoke of the part played by the sympathetico-adrenal system in the causation of shock. It has been shown, he said, that any attempt to raise the blood pressure with vaso-constrictors is useless, since peripheral constriction can do nothing to help the venous return to the heart and will probably make matters worse rather than better. He condemned all measures likely to lead to dehydration, such as purgation before operation, and pointed out once more that any attempt to restore the blood volume must be begun early, before tissue anoxia has time to develop. In the light of recent knowledge, one may add, the prospects of efficient treatment seem much brighter than they did when shock was attributed to histamine.

ANÆSTHETICS FOR BRAIN SURGERY

THE great length of time that it is now customary to spend on operations for cerebral tumour has set some awkward problems for the anæsthetist. It is not that he is required to maintain deep narcosis for several hours; for fortunately during a great part of these operations the surgeon is dealing with tissues that are insensitive. The difficulty is that from first to last it is of great importance that the patient shall not cough or move. Either of these activities is apt to provoke hæmorrhage, and this has to be most carefully avoided. It might be thought that local analgesics would provide the necessary quiet; but for several reasons, which are well set out by Geoffrey Kaye,[4] this solution of the problem is not a satisfactory one. Even if the patient is kept free from pain—and local anæsthesia will not always ensure this when the dura is incised—he is apt to find the prolonged close restriction to one position as intolerable as pain itself. Moreover, even if pain is not felt there is much uncomfortable sensation during the trephining or punching-out of bone. It appears that the soundest plan is to keep the patient really unconscious throughout. Since a deep anæsthesia is not needed for any part of the operation nitrous oxide administered endotracheally provides an efficient narcosis, and the results as regards post-operative conditions are excellent when it is employed. Obviously when narcosis is to be kept up for several hours, as is now common at these operations, it is essential that any anæsthetic must be avoided that has, like ether or chloroform, a deleterious action on the general metabolism of the body. The manner in which nitrous oxide and oxygen can be rendered effective for these long brain operations, and their association with appropriate pre-medication are described in Dr. Brennan's paper on p. 315 of our present issue. When attempts have been made to meet the requirements of cerebral operations by the combination of basal narcosis and local analgesics the drawback has been that neither of these applications has a long enough action, and usually it has been found necessary to institute general anæsthesia before the surgeon has finished. Such an interruption upsets the smooth progress of the operation. Far better to have general anæsthesia from first to last.

RADIOTHERAPY OF PNEUMONIA

X RAYS have been little used in the treatment of acute inflammatory disease by physicians and surgeons in this country, despite encouraging reports from the Continent of their success in the management of carbuncles and furunculosis. Rather is the converse the rule, for the appearance of a patch of consolidation in the underlying lung during intensive irradiation of the chest for the treatment of breast cancer has been noticed occasionally by radiotherapists. This area of "pneumonia," which may be chronic, has often been mistaken for a secondary deposit of the primary growth.

Of particular interest, therefore, is an account by E. V. Powell [1] of Temple, Texas, of his experience of X ray therapy in pneumonia. During the last four and a half years he has used it in 104 cases of acute lobar pneumonia proved clinically, radiologically, and by examination of sputum. He reports relief from distressing symptoms within three hours, and a critical fall of temperature within 12–24 hours of one application. Should the temperature remain raised and the leucocyte count high two or more applications of reduced dose may be necessary. For his series he claims a mortality of just under 5 per cent., and he declares that for a type I pneumococcal infection X ray therapy is more valuable even than serum. He finds that the disappearance of the opacity on the radiographic plate lags behind the constitutional improvement of the patient just as it does if the disease is allowed to pursue its natural course. He has also used X rays in 30 cases of broncho-pneumonia but with less startling results; the response being more variable and the disease, on the whole, less favourably influenced than in acute lobar consolidation. This agrees with the observation that X rays applied early in lobar pneumonia during the congestive stage make the patient worse rather than

[1] Szanto, G., *Surg. Gynec. Obstet.* 1937, 65, 453.
[2] Kopp, I., and Solomon, H. C., *Arch. intern. Med.* 1937, 60, 597.
[3] Hicks, S., *Aust. N.Z. J. Surg.* 1937, 7, 99.
[4] *Aust. N.Z. J. Surg.* 1937, 7, 134.

[1] *J. Amer. med. Ass.* Jan. 1st, 1938, p. 19.

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better and provoke a spread of disease. Discussing the mechanism whereby irradiation exerts its beneficial effect Dr. Powell inclines to think that it is by destruction of infiltrating leucocytes with the liberation of antibodies. Other workers believe that X rays increase the bactericidal power of the blood, which is possibly another way of saying the same thing.

Stimulating though Dr. Powell's results may be they should, nevertheless, be accepted with caution in the present state of our knowledge and in the absence of confirmation.

NORMAL AND ABNORMAL INTESTINAL MOVEMENTS

DURING the last seventy years very many attempts have been made to give a satisfactory account of the movements of the small intestine. That none of these efforts has been completely successful is largely due to the difficulty of devising a technique of observation and measurement which does not itself influence the activity of the gut and so render uncertain any interpretation of the results. The most acceptable method involves the direct inspection of the intestinal movements through a "window" inserted into the abdominal wall of an animal, but hitherto this method has not been as fruitful as might be expected, partly because of the operative difficulty of providing a sufficiently large window and partly because the window seldom remains transparent, more often becoming obscured by fibrin. In the latest study[1] on these lines both difficulties have been overcome, and, in addition, colour cinematography has been used to record and analyse the movements in the rabbit. In this animal the movements of the small intestine are of three types. They are (*a*) pendulum movements, produced by a combination of stationary and advancing contractions of the longitudinal musculature; (*b*) rhythmic segmentation, responsible for the dispersal and mixing of the intestinal contents; and (*c*) peristalsis, which proceeds at an average velocity of 3 cm. per sec. The "law of the intestine" of Bayliss and Starling,[2] which describes peristalsis as consisting of a wave of contraction preceded by a wave of active relaxation, is finally rejected. The existence, in normal circumstances, of a wave of relaxation has long been questioned, and there has been a steady accumulation of evidence against it. The work under review leaves no room for doubt that any dilatation preceding a wave of peristaltic contraction is merely due to mechanical distension by intestinal contents pushed on by the peristalsis. The experimental production of traumatic ileus serves to emphasise the reflex, as distinct from humoral, factors concerned in the causation of this condition. Complete and prolonged intestinal inhibition may be produced in the rabbit by squeezing the kidney. The effect is abolished by cocainising the renal pedicle, and is not seen in the second animal of a crossed-circulation experiment. It is generally accepted that stimulation of the splanchnic nerves diminishes the tone and movements of the small intestine. The effectiveness of pressure on the kidney in producing ileus is diminished by preliminary extirpation of the adrenals, indicating that an outpouring of adrenaline is of importance in heightening and prolonging the result of reflex inhibition. Ileus under these conditions is not secondary to local vascular changes, for the blood-supply is not reduced until after the intestine has come to rest. To translate the results of animal experiments directly into terms of human physiology and pathology is notoriously unsafe, but these observations certainly suggest the possibility that post-operative ileus might occasionally be prevented by a more extensive use of local anæsthesia, particularly of splanchnic block.

One other important outcome of this experimental study is a renewed emphasis upon the value of morphine in conditions of intestinal atony. The notion that morphine in therapeutic dosage depresses intestinal movements, though certainly incorrect, has lingered on in text-books and in the minds of practising physicians. In rabbits with peritonitis, Prostigmin and morphine both restored tone and movements to the intestine, and neither had secondary effects. Doryl, Esmodil, pilocarpine, Pituitrin, and ergotamine all produced abnormal movements, if any, and all had unwanted secondary effects. Prostigmin was more effective than morphine, but the general sedative value of the latter should perhaps make it the drug of choice in conditions of intestinal paralysis.

[1] Rödén, S. H.: An Experimental Study on Intestinal Movements; Particularly with Regard to Ileus Conditions in Cases of Trauma and Peritonitis. *Acta chir. scand.* 1937, Suppl. LI.

[2] Bayliss, W. M., and Starling, E. H., *J. Physiol.* 1899, 24, 99.

THE DANGER OF INHALING OILS

LIPOID pneumonia is the term applied to a type of pulmonary consolidation produced by the aspiration of oily liquids. It is occasionally found in debilitated infants and in bedridden or paralysed patients after the oral administration of such substances as cod-liver oil or liquid paraffin, and it may follow long-continued nasal instillations of oils. A number of cases has been reported in the last twelve years, and the department of health of New York City last year issued to its nursing personnel a warning about the dangers of the condition. In the past most of the recorded cases have been in infants under two, but a recent investigation of its incidence in this country has shown that it is not exclusively a children's disease. In 813 consecutive autopsies at University College Hospital Dr. Paterson[1] found 8 cases of lipoid pneumonia, 6 being in adults over fifty. The probable cause of the aspiration was put down as cardiospasm with regurgitation in 1 case, vomiting in 1, and coma in 2 others. In 2 the oily substance was known to be liquid paraffin. There were 2 infants, aged two weeks, in whom convulsions and vomiting were cited as the cause and milk the substance aspirated. The condition in the lungs was generally that of fairly severe broncho-pneumonia with prominent greyish or white nodules in the lung substance, sometimes up to 2 in. in diameter. Histologically the characteristic feature is the presence of lipoid substances contained within phagocytic cells in the lung alveoli.

Paterson has studied the effects of various animal and vegetable oils injected intratracheally in rats and rabbits. He injected 0·1 and 0·2 c.cm. for 7 consecutive days, examining the lungs at periods 7, 27, and 70 days later. The result varied considerably with the different oils. As a rule the vegetable oils produced less reaction in the lungs than the mineral, fish, or animal oils. Liquid paraffin gave a well-marked nodular change, consisting of a macrophage accumulation around the oily substance in the lung alveoli, followed later by giant-cell formations with a sharp connective tissue reaction. Cod-liver oil had a somewhat similar effect but without giant cells. There was a very slight response with castor oil or with neohydriol (poppy-seed oil as used in lipoidol),

[1] Paterson, J. L. H., *J. Path. Bact.* January, 1938, p. 151.

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most being removed by methods other than phagocytosis, leaving very little fibrous change. With cow's milk no definite lesions were found in the lungs after 56 days. Some of the esters of fatty acids were toxic, causing death from acute pulmonary œdema shortly after the injection, but as a rule these lipoids were so rapidly removed from the tissues that there was little or no permanent effect. The phosphatide lecithin produced a considerable cellular response with hyperplasia of the peribronchial lymphatic tissue.

The conclusion Paterson reaches is that relatively large quantities, given in a series of small doses, are required to produce a typical reaction; a point of obvious importance in relation to the use of lipoidol for diagnostic purposes. In general the amount of the tissue reaction is in inverse proportion to the rate of removal of the oil. The more unsaturated the oily substance, the more finely it is emulsified and the more rapidly it is removed by phagocytes.

ILEITIS

IT is surprising that regional ileitis—rediscovered six years ago by Crohn[1] after reports as early as 1806—should for so long have escaped surgical observation. In the acute stage it causes symptoms of intra-abdominal inflammation that must lead in the greater number of cases to laparotomy; while, in the chronic stage, it produces a lump, and how many abdominal lumps remain indefinitely unexplored? However this may be, the condition is now of practical surgical importance, and Jackson[2] has collected 219 case reports since Crohn's paper in 1932. The current issue of the *British Journal of Surgery* contains four articles on cases occurring in this country. It is undoubtedly important that the disease should be generally recognised, for, as we have previously pointed out,[3] the surgeon who delivers an innocuous appendix through a tiny incision may be missing a serious cause of the patient's symptoms.

Crohn himself said that the most important differential diagnosis was from ulcerative colitis. There is colicky peri-umbilical pain, with loose motions, three to five in the day, the stools containing blood, mucus, and pus—cases of this kind are reported by Barrington-Ward and Norrish.[4] Sigmoidoscopy may not help, for, even when the large bowel is affected, the ulceration is not likely to be as low as the pelvic colon. It is typical of ileitis—and of the same disease as it affects the colon—that a lump is palpable through the abdominal wall. Obstructive symptoms gradually develop and may dominate the picture. At operation the terminal ileum, or in more exceptional cases the jejunum or colon, is found to be enormously thickened. Sometimes it is only after resection that tubercle and cancer can be excluded. James[5] describes a case in which the large bowel from the distal part of the transverse colon to the pelvic colon was affected. Crohn, speaking in a discussion following a paper of Kantor's,[6] recognised that the disease was not confined to the ileum, but he suggested that not all non-specific lesions of the colon were of the same nature as the condition he had described. The two chronic inflammatory tumours that Ralphs[7] reports may have resulted from local trauma and hardly seem to fit into the same category as those of Barrington-Ward and James.

The acute type of the disease deserves separate consideration. Clearly the abdomen is most likely to be opened on a diagnosis of acute appendicitis, as it was in one of Mailer's[8] cases and in 3 of the 6 cases reported by Strömbeck.[9] If there is no pus it seems to be fairly satisfactory to close the abdomen and wait for the inflammation to subside. As yet we do not know the ultimate history of these cases, but presumably some of them come to resection in the end. When an abscess has formed drainage is very likely to be followed by the formation of fistulous tracks. Ileitis is to be suspected in cases of so-called appendix abscess which, instead of healing, develop fæcal fistulæ and a chronically suppurating wound. It would obviously be an advantage to know that the appendix was normal at operation, and probably this knowledge could often be gained without breaking down protective adhesions. In the diagnosis from appendicitis, Crohn mentions the slower development of the symptoms in ileitis and the evidence of obstruction that may be present. Mailer draws attention to the possibility of melæna, which of course is very rare in appendicitis. Strömbeck gives a very good account of the radiological findings in his cases, with some excellent illustrations. Kantor has described the typical findings as an abnormal shape of the last filled loop of ileum, dilatation of the ileal loops above this, and an extreme narrowing of the shadow of the terminal ileum giving the "string sign" in the radiogram.

CLAUS JENSEN

IT comes as a shock to hear of the death of Dr. Claus Jensen, from pneumonia following injury in a motor accident, at Copenhagen on Jan. 24th in his thirty-eighth year. His circle of English friends had been widened by lectures given to sections of the Royal Society of Medicine in April, 1935, and in April of last year, in which he described the 1934 epidemic of poliomyelitis in Denmark and his methods of immunisation against diphtheria. Apart from their other qualities both were impressive in illustrating what can be done in the study and control of infectious disease in a country where close liaison is maintained between hospital, physician, public health officer, and laboratory worker. To these investigations Jensen gave all his enthusiasm as an epidemiologist and his exceptional skill as a laboratory worker. His work afforded him deep satisfaction and he particularly enjoyed the opportunity of speaking to English audiences. In the preparation and presentation of his lectures he spared neither time nor effort, even to the extent of learning and using idiomatic English, and they will be remembered as fine expositions by a vivid and attractive personality.

Much of Jensen's short professional life was spent at the State Serum Institute at Copenhagen, and here, in association with congenial colleagues, he was able to pursue the kind of laboratory research that appealed to him most. His inquiries into diphtheria started from the observations of Fraser and Wigham, who had shown that the rabbit is a very suitable animal for the assay of diphtheria reagents, and after a close study of the whole subject he was able to devise a method of assay that is now widely used. The monograph in which this work was described displays an orderly and thorough mind, and this was in due course applied to many problems. Of its achievements the latest and perhaps most notable was his method for the active immunisation of man against diphtheria by the combined subcutaneous

[1] Crohn, B. B., *J. Amer. med. Ass.* 1932, 99, 1326.
[2] Jackson, A. S., *Surg. Gynec. Obstet.* 1933, 37, 637.
[3] *Lancet*, 1937, 2, 331.
[4] Barrington-Ward, Sir L., and Norrish, R. E., *Brit. J. Surg.* 1938, 99, 530.
[5] James, T. G. I., *Ibid*, p. 511.
[6] Kantor, J. L., *J. Amer. med. Ass.* 1934, 103, 2016.
[7] Ralphs, F. G., *Brit. J. Surg.* 1938, 89, 524.
[8] Mailer, R., *Ibid*, p. 517.
[9] Strömbeck, J. P., *Acta chir. scand.* 1937, 80, Suppl. L.

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and intranasal application of the antigen. He determined the antitoxin content of the individual sera of large groups of human beings, developed the idea of the "antitoxin spectra" of populations, determined the effect of active immunisation on individuals and on groups and on the previously determined "spectrum," and advanced a scheme for the active immunisation of man against diphtheria. To what extent Jensen's ideas and methods, especially the application of the secondary stimulus to the nasal mucous membrane, will be generally accepted it is too early to say. That he had remarkable success in Denmark cannot be denied; but he was the first to admit that his work there was conducted under particularly favourable conditions, not the least important of which was the supply, from his colleagues Schmidt and Hansen, of highly purified reagents.

In 1935 Jensen became director of biological standards, and thenceforward he was closely associated with the Health Organisation of the League of Nations, being responsible for the supply and distribution of the international standards for antitoxins and antisera. This development, from its inception, has been the special interest and activity of his chief, Dr. Th. Madsen, director of the State Serum Institute, and all who knew Jensen felt that this work and association gave his talents appropriate scope. Unfortunately he suffered much from his temperament; few men passed "from grave to gay, from lively to severe" so quickly and so often. His method of working was not a good one; too often he overworked, and paid the penalty of physical and nervous exhaustion. His death is untimely, for it ends a career full of promise as well as performance.

THE WAYWARD HAND

THE collection and classification of anatomical anomalies has always been regarded as a branch of medical science. The Darwinian conception of evolution gave great zest to their study because they were expected to, and in fact did, throw light upon the history of the human body. In the course of time it was felt that this Darwinian harvest had been garnered, and enthusiasm for their study abated somewhat. Nevertheless the continued advances in our knowledge of embryological processes, and the further insight into these gained by experimental methods, kept up interest and tempted investigators to explain anomalies in terms of normal development. Spemann's experimental production of situs inversus was a great embryological triumph, and made one feel as if peering into the very depths of biology. Something of the same fascination is evident in Prof. Müller's monograph [1] on the congenital anomalies of the human hand, in which over a hundred variations of the normal development have been described and illustrated. These anatomical anomalies are well adapted for genetical study. They are easily recognised and recorded; they have the essential attributes of being present or not present; they can be studied from their first manifestation in the embryo when the extremities appear as minute paddle-like outgrowths. Broadly the anomalies are disorders of either excessive or diminished growth. They have been arranged in a graded series from monstrous overgrowths to complete absence, and in the same person it has been recorded that one hand showed polydactyly and the other oligodactyly. The close relationship and interchangeability of all the different defective forms is shown by the occurrence of many varieties in members of the same family; the author has assembled a number of family trees of the inheritance of these anomalies of the hand. His studies also emphasise that these anomalies are implicit in the development and mode of growth of the normal limb. A deviation from the normal is always preceded by a change in the proportions of the soft parts. A hand in which the bones are short and thick, or a supernumerary digit occurs, is known to be one in which at an earlier stage the tissue mass from which the digits grow out was shortened in a distal direction, but expanded from the radial to the ulnar side. Even if we had not numerous family trees to support the hereditary nature of these deviations, we should be driven by studying their early appearance in the growing embryo to conclude that they have their cause and their beginning right back in the fertilised ovum. Their explanation lies obscurely in the behaviour of the genes.

A study [2] has recently been made of supernumerary digits in the guinea-pig. The occurrence of the anomaly in this laboratory animal gave the opportunity for controlled matings, and the anatomy could be ascertained at all ages. Such an anomaly as polydactyly is borne by a gene (heterozygous) in one of the parents, and in the offspring is present along with a gene that stands for the normal number of digits. In these animals it was found that a double dose of the gene (homozygous) for supernumerary digits was lethal, and the embryos died in utero. By studying the viable embryos with the anomalies it was found that the gene came into action at the time of the development of the hand and digits and, as our human studies show, first expressed itself in an unusual proportion of the antecedent soft parts. Realisation that the action of a particular gene is held up until its particular moment arrives in the course of development, that it then may hurry or delay the processes of development it somehow excites, enables anyone with an elementary knowledge of chemistry to play the part of speculator. It has been recorded [3] that a female Scottish migrant to Wales carried with her the gene for polydactyly, and five generations of her descendants have exhibited this odd anomaly. The same family has carried this useless duplicity of the thumb to Australia and America.

SIR JAMES CRICHTON-BROWNE died at Dumfries on Monday last at the age of 97. He took his first qualification at Edinburgh in 1861, became F.R.S. in 1883, and was for nearly half a century one of the Lord Chancellor's visitors in lunacy.

INDEX TO "THE LANCET," VOL. II, 1937

THE Index and Title-page to Vol. II, 1937, which was completed with the issue of Dec. 25th, is now ready. A copy will be sent gratis to subscribers on receipt of a post card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

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[1] Die angeborenen Fehlbildungen der menschlichen Hand. By Prof. Walther Müller. Leipzig: Georg Thieme. 1937. Pp. 170. R.M.14.

[2] Scott, J. P., *J. Exp. Zool.* 1937, 77, 123.

[3] Abnormalities in the Proportions of Fingers in Hereditary Anarthrosis. By G. H. Daniel. *Ann. Eugen. Camb.* 1937, 7, 281.

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SPECIAL ARTICLES

NUTRITION AND DISEASE IN DENMARK

BY JOHANNE CHRISTIANSEN, M.D. Copenhagen

AT present Denmark exceeds all other countries in the consumption of margarine and sugar per head. My paper is an attempt to assess the influence of this and other dietary characteristics on the health of the inhabitants.

In Table I the consumption of fat, eggs, sugar, meat, tea, coffee, and tobacco in 18 countries is compared, and the mortality and infant mortality-rates in those countries are given. The figures have been obtained from the Danish Bureau of Dairy Statistics and the Danish publications of the Statistical Department, or calculated from the publications of the League of Nations (1936). They show that in Denmark on the average 1580 calories of the daily intake is supplied by sugar and fat devoid of vitamins, and that the infant mortality is very high. In Norway, the country with the second highest consumption of margarine, the margarine almost always contains butter or is vitaminised. In Holland the total amount of dairy produce is less than in Denmark, but the sale of margarine containing less than a quarter of butter is strictly forbidden; in this way the poorest mothers and children get part of their vitamins. The Danish diet is conspicuous not only for the large amount of fat poor in vitamins taken but also for the small number of eggs (Figs. 1 and 2), Finland being the only country which consumes fewer per head. Sweden alone consumes more coffee, and if substitutes were counted, Denmark would have the highest figure of all, corresponding to the enormous consumption of sugar; five cups of "coffee" daily is customary.

It may be noted too that Table I shows an inverse relation between infant mortality and the consumption of meat, fish, and dairy products. New Zealand, Australia, and Norway, with a high consumption of dairy products, the highest of meat and fish, and the least of calories poor in vitamins, have the lowest mortality-rates for infants and adults. After the experience at the Olympiad in Berlin the value of meat and fish should be better appreciated in northern countries.

Until December, 1936, no margarine was vitaminised in Denmark; this may have been because the peasants feared the power of the margarine industry, and were afraid that, were vitamins added to margarine, butter consumption would cease altogether. The peasants eat no butter themselves, regarding it as a luxury.

Fat-consumption in Denmark has increased enormously in recent decades (Table II), and the average Dane is growing very fat. The almost incredible amount of margarine is eaten partly because of its cheapness; but, judging by the amount of tobacco consumed, poverty is unlikely to be the whole cause. The excess is probably due also to vitamin-hunger, which induces people to eat a lot to obtain the vita-

TABLE I

CONSUMPTION OF FOODSTUFFS AND TOBACCO IN VARIOUS COUNTRIES, *c.* 1930–34

—	Kg. per person.							Daily calories.			No. of eggs (yearly).	Albumin from meat (grammes daily).†	Infant mortality per 1000 (1931).	Mortality per 1000 (1931).	Kg. per person, 1931–32.		
	Fat from butter, milk, cheese.	Fat from pork (counted as 55 % of the meat).	Butter.	Margarine.	Total fat.	Fat without vitamins.	Sugar.	(I) From sugar.	(II) From fat without vitamins.	From (I) and (II).					Tobacco.	Coffee.	Tea.
New Zealand .	22·9	6·5	17·0	0	29·4	6·5	47·9	527	160	687	..	55	32	8·3	1·5	0·1	3·9
Australia ..	18·4	4·4	13·0	0	22·8	4·4	48·1	529	108	637	..	47	42	8·7	..	..	..
Norway ..	17·6	7·1	?	17·0‡	41·7	7·1	31·5	347	180	527	124	14	46	10·9	1·3	7·0	0·07
Switzerland ..	20·2	11·9	6·3	*c.* 8·0	40·1	20·0	44·1	485	493	978	156	20	49	12·1	..	..	..
Netherlands ..	14·4	12·6	7·2	5·8	32·8	18·4	30·6	337	454	791	100	16	50	9·6	3·6	4·6	1·1
Sweden ..	..	11·5	9·2	8·9	..	20·4	42·7	470	503	973	110	15	57	12·5	1·4	8·6	0·07
U.S.A. ..	14·6	19·5	8·1	5·6	39·7	25·1	46·3	509	619	1128	199	24	65	11·3	2·6	6·3	0·3
England ..	16·0	11·4	9·9	3·8	31·2	15·2	49·5	545	375	920	172	29	66	12·3	1·5	0·4	4·4
Canada ..	..	19·1	14·0	0	..	19·1	42·3	465	471	936	284	26	70	9·3	..	..	..
Finland ..	..	7·2	..	..	..	..	23·0	253	..	..	41	13	75	14·2	0·8	5·1	0·04
France ..	12·4	5·1	5·8	0·8	18·3 +oil.	5·9 +oil.	25·6	282	145 +oil.	427 +oil.	149	15	76	16·2	1·4	4·6	0·04
Denmark* ..	15·1	17·9	8·0	22·0	55·0	40·0	54·0	594	986	1580·	86	22	81	11·4	2·0	8·4	0·17
Belgium ..	14·4	11·3	9·4	3·8	29·5	15·1	27·9	307	372	679	236	16	82	13·3	3·2	..	..
Germany ..	14·2	17·7	7·2	6·3	38·2	24·0	23·4	257	592	849	129	18	83	11·2	1·9	2·4	0·08
Austria ..	..	..	2·8	*c.* 2·7	..	..	27·5	303	..	..	98	..	103	14·0	..	..	..
Italy	4·1	2·7	0·9	0·2	..	..	8·1	89	..	..	119	7	113	14·8	0·6	1·1	..
Czechoslovakia	..	9·6	..	*c.* 4·0	..	..	25·2	277	..	..	115	14	134	14·3	..	..	..
Poland ..	9·0	6·0	..	..	..	..	10·3	113	..	..	110	7	143	15·5	..	..	..

* In Denmark half the cheese is produced from centrifugated milk, which fact has not been taken into account in the Tables of the statistical publication of the League of Nations, 1936. The total fat from dairy products in Denmark is therefore less than appears from the figures in the League of Nations publications.

† Excluding consumption of fish, which for Norway is very large (50–60 kg. per head). The meat is from beef, veal, mutton, lamb, and pork.

‡ With vitamins.

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mins and minerals in poor food. Another reason is Hindhede's very energetic propaganda which has been carried on for more than thirty years; his ideas are that vegetable margarine is as good as, and much cheaper than, butter, and that animal protein and fat is "poison" or "luxury."

EFFECT OF RATIONING DURING THE WAR

Hindhede has interpreted as the best proof of his theories the classical illustration given by Denmark in 1918 of the correlation between nutrition and disease. He maintains that the low mortality of that year was due to a sort of vegetarian diet brought about by rationing, and in foreign papers and books a similar interpretation is given; for instance, Berman (1933) says:

"Hindhede rationed his people in accordance with his ideas and for those four years the three millions of Denmark lived upon the low protein diet of little meat, but much bran and potatoes. As a result there was a sharp drop in the Danish death-rate, with something of an upward rebound at the end of the food-rationing period when war was over, and the people returned to the fleshpots of Egypt."

TABLE II—CONSUMPTION OF FATS IN DENMARK FROM 1888 TO 1935: (KG. PER HEAD PER ANNUM)

Years.	Butter.	Margarine.	Lard.	Fat from pork.*	Total fat from these four sources.
1888 ..	10·0	1·0	3·0	*c.* 10·0	*c.* 24·0
1908 ..	8·0	11·5	3·0	*c.* 6·0	*c.* 28·5
1914 ..	8·1	15·7	1·05	12·8	37·6
1916† ..	3·2	19·8	0·92	17·5	41·4
1918‡ ..	14·5	0·4	0·83	9·2	24·9
1920 ..	3·3	17·5	1·3	9·2	31·3
1925 ..	5·6	20·9	1·23	10·4	38·1
1930 ..	6·1	22·6	0·71	14·7	44·1
1935 ..	9·4	21·2	0·79	13·6	45·0

* Counted as 50 per cent. of pork.
† Year with maximal cases of xerophthalmia.
‡ Year with minimal cases of xerophthalmia.
In 1918 the total consumption of fat was small (as before the time of the margarine), but more than half of it was butter, which was divided equally among the population, which is not the case when margarine is available.

TABLE III

FOOD CONSUMPTION AND MORTALITY IN DENMARK (1903–35)

(Difference between production and export)

—	Butter	Margarine.	Lard.	Total fat from cols. 1–3.	Cheese	Beef and veal.	Flesh of swine.	All flesh.	Export of preserved meat and sausage.*	Fish.	Eggs.	Rye-meal.	Wheat-meal.	Sugar.	Mortality per 1000.	Infant mortality per 1000.
	kg.	kg.	kg.	kg.	kg.	kg.	kg.	kg.	kg.	kg.	kg.	kg.	kg.	kg.		
1935 ..	9·4	21·2	0·79	31·4	6·1	25·7	27·3	53·0	1·2	15·5	6·6	43·6	46·6	48·2	11·1	71
1934 ..	9·1	19·6	1·86	30·6	5·8	27·8	31·7	59·5	1·4	14·2	6·7	42·7	45·6	51·3	10·4	64
1933 ..	9·6	20·5	1·27	31·4	5·8	28·3	41·5	69·8	1·5	13·3	6·7	43·6	50·5	49·5	10·6	68
1932 ..	8·5	20·4	0·44	29·3	5·4	28·8	41·6	70·4	1·3	12·7	6·9	44·0	46·2	49·7	11·6	72
1931 ..	6·7	22·0	0·06	28·8	6·0	23·4	35·6	59·0	1·0	14·5	6·6	45·2	49·3	48·7	11·4	81
1930 ..	6·1	22·6	0·71	29·4	6·0	23·8	29·5	53·3	0·9	15·2	6·5	45·6	50·1	50·1	10·8	80
1929 ..	5·9	22·5	0·99	29·4	5·7	21·8	26·9	48·7	0·7	14·6	6·4	48·5	48·8	49·2	11·2	83
1928 ..	5·4	22·0	1·03	28·4	—	21·8	27·6	49·4	0·7	16·2	6·5	46·6	52·3	48·4	11·0	81
1927 ..	5·6	21·2	1·01	27·8	—	20·3	27·2	47·5	0·6	15·3	5·4	43·6	49·8	46·8	11·6	83
1926 ..	6·0	20·7	1·01	27·7	—	21·9	22·8	44·7	0·4	13·8	5·4	45·3	51·5	50·6	11·0	84
1925 ..	5·6	20·9	1·23	27·7	—	23·9	20·8	44·7	0·4	15·1	5·7	43·5	49·8	49·4	10·8	80
1924 ..	5·2	20·6	1·48	27·3	—	22·4	23·3	45·7	0·4	14·6	4·9	47·5	51·1	45·5	11·2	84
1923 ..	6·3	19·3	1·85	27·4	—	23·0	12·2	35·2	0·3	15·7	5·0	43·6	51·9	44·0	11·3	83
1922 ..	7·5	17·2	1·90	26·6	5·2	27·4	17·5	44·9	0·1	15·1	4·9	38·0	51·3	47·7	11·9	85
1921 ..	4·0	16·9	1·37	22·3	—	25·9	18·6	44·5	0·1	15·8	3·3	43·9	44·5	41·0	11·0	77
1920 ..	3·3	17·5	1·30	22·1	—	23·9	18·4	42·3	0·2	18·1	3·1	—	—	41·4	12·9	90
1919 ..	8·4	12·6	1·68	22·7	—	27·5	23·5	51·0	0·6	16·9	4·7	—	41·0	44·1	13·0	92
1918 ..	14·5	0·4	0·83	15·7	—	29·9	18·4	48·3	2·3	16·5	4·2	—	36·5	41·0	13·0	74
Oct. 1, 1917, to Oct. 1, 1918	Period of health before the pandemic influenza, beginning October, 1918.														10·4	69
1917 ..	9·9	11·2	2·29	23·4	—	16·1	40·6	56·7	2·6	10·9	5·9	—	39·8	37·2	13·2	100
1916 ..	3·2	19·8	0·92	23·9	—	6·2	35·1	41·3	5·8	8·2	5·7	—	52·5	46·5	13·4	100
1915 ..	3·3	18·9	2·59	24·8	—	20·9	24·7	45·6	5·5	13·1	6·4	—	49·3	45·9	12·8	95
1914 ..	8·1	15·7	1·05	24·8	5·4	23·4	25·7	49·1	2·4	15·2	7·6	—	50·5	39·8	12·5	98
1909 ..	—	—	—	—	—	23·1	—	—	—	—	3·6	—	—	—	13·3	98
1905 ..	8·1	—	—	—	6·3	—	—	—	—	—	—	—	—	—	15·0	121
1903 ..	—	—	—	—	—	22·8	—	—	—	—	2·3	—	—	—	14·6	116

* Cannot be divided into beef and pork.

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This interpretation of the cause of the low mortality is not acceptable however when the actual consumption of foodstuffs in that year is considered. Before me C. E. Bloch and E. Widmark have opposed Hindhede's faulty explanation. After reading the report by Sir John Boyd Orr (1936) I thought that a corresponding investigation might be made in Denmark, and the Statistical Bureau of Copenhagen (Departments-chef E. Cohn and his secretary Mr. Bjerke) most cordially worked out the consumption of the chief sorts of foodstuffs in the country for the years shown in Table III. Table IV gives the consumption of butter and margarine together with the numbers of hours of sunshine, the infant mortality, and the incidence of certain diseases over a similar period of years. The time of rationing was from October, 1917, to the spring of 1919; the rationed foods were bread, sugar, coffee, butter, lard, and milk. But rationing was not at all the same as restriction. The milk ration was two pints for small children and one for other people, which was much more than the usual consumption; the butter ration was 250 grammes a week for all persons; bread was rationed according to previous consumption; potatoes were scarce because they were used for the cattle, and margarine was unobtainable because the submarine blockade, from the autumn of 1917 to the spring of 1919, stopped all imports of vegetable oils. Meat, eggs, and fish, on the other hand, were in free circulation, and Table III shows that the consumption of meat (beef and veal) was actually much higher in 1918 than in all the other years of this century. The result of the rationing was therefore that 600 calories per head usually taken as margarine were taken half as butter and half as other valuable food (meat, milk, fish); a margarine-eating people became suddenly butter-eaters, but certainly not vegetarians (Fig. 3).

Table IV gives some interesting results of this unique but till now misunderstood experiment with a country's population. The infant mortality and the incidence of xerophthalmia (Bloch 1921), also of measles and whooping-cough, were low in 1918. It seems likely that these facts may be attributed to the greater intake of fat-soluble vitamins, nutrition factors with a very rapid influence. In 1919 there were still fewer cases of xerophthalmia, the reason being presumably that the mothers of 1918 were well fed and that margarine was not available in the winter of 1919. In subsequent years the cases were less numerous and because of the instructions of Bloch, not so serious; but there are no figures available for the years after 1921 (Blegvad 1924), and the disease has not yet disappeared.

It occurred to me that the second minimum of infant mortality (1921) shown in Table IV might be due to sunshine and I found, as the Table shows, that the sun shone more in Denmark in that year than in any other. Bloch (1931) and E. Mellanby (1934) have both emphasised the anti-infective properties of vitamin A, but one might conclude that both vitamins A and D have an influence on the occurrence of measles and whooping-cough. I have also gone through the incidence of all other infectious diseases in Denmark between 1910 and 1930: mumps, scarlet fever, erysipelas, tonsillitis, and infantile paralysis show minima in 1918, but none in 1921; broncho-pneumonia, capillary bronchitis, and influenza show minima in 1921 but none in 1918; tracheo-bronchitis shows minima in both years. Doubtful influence was seen for rheumatic fever, puerperal fever (slight minima), and for tuberculosis. The number of cases of this last disease fell in 1918 and did not seem to rise again. A difficulty in interpretation in these diseases is the uncertainty in diagnosis, which does not permit of statistical treatment in the same manner as for diphtheria and scarlet fever. Typhus, cerebro-spinal fever, diphtheria, lobar pneumonia, acute diarrhœa, gonorrhœa, syphilis, and scabies were without minima in either year.

TABLE IV—CONSUMPTION OF MARGARINE AND BUTTER, AND HOURS OF SUNSHINE IN RELATION TO INFANT MORTALITY AND INFECTIOUS DISEASES

—	Kg. per head.		Cases of xeroph-thalmia.	Hours of sun-shine.	Infant mor-tality (per 1000).	Cases of measles.	Cases of whoop-ing-cough.
	Butter	Mar-garine.					
1910	—	13·1	26	1445	102	10,264	7,247
1911	—	13·6	20	1529	106	22,927	11,328
1912	—	15·1	40	1101	93	12,103	24,565
1913	—	*c.* 15	40	1396	94	13,788	15,696
1914	8·1	15·7	48	1469	98	18,256	8,436
1915	3·3	18·9	53	1501	95	11,841	7,450
1916	3·2	19·8	78	1342	100	22,103	31,444
1917	9·9	11·1	71	1857	100	14,088	9,884
1918	14·5	0·4	9	1637	74	9,075	6,321
1919	8·4	12·6	4	1549	92	22,157	33,278
1920	3·3	17·4	25	1550	90	27,758	19,943
1921	4·0	16·9	?	1992	77	5,181	5,037
1922	7·5	17·1	?	1587	85	9,596	22,060
1923	6·3	19·2	?	1488	83	32,166	26,446
1924	5·2	20·6	?	1562	84	33,856	8,443
1925	5·6	20·9	?	1798	80	12,792	20,559
1926	6·0	20·7	?	1516	84	18,443	30,399
1927	5·6	21·2	?	1496	83	35,258	18,249
1928	5·4	22·0	?	1612	81	34,877	19,617
1929	5·9	22·5	?	1649	83	4,613	10,399
1930	6·1	22·6	?	1576	80	18,792	17,738

In the years 1910–30 there was an increase of the population from *c.* 2·7 to *c.* 3·5 million of inhabitants.

EXAMPLE OF DANISH MALNUTRITION

The following is a typical case of Danish malnutrition.

A girl of 19 (seen in September, 1936) complained of dyspepsia, headache, pain in her hips and back, amenorrhœa for five years, somnolence, and extreme exhaustion. Her weight was 48 kg. She had a dry rough skin, anæmia, constipation, very bad teeth, rachitis tarda, gastritis subacida. One of seven children of a poor peasant, she had been brought up on dark rye bread, margarine, skim-milk, cooked barley, small quantities of vegetables, apples in the summer, potatoes and a brown sauce made of margarine, flour, and meat juice. In accordance with Hindhede's views, she had had little meat or fish and few eggs. At the age of 12 she weighed 75 kg. (11 st. 11 lb.), but she then began to diet herself, losing her appetite and energy; menstruation ceased and she became very thin. Hospital treatment with insulin injections had been ineffective. When seen she had been living on bread, margarine, coffee, tea, porridge, potatoes, brown sauce, few vegetables, and chocolate. After six weeks on the dietary scheme for pregnant women set out by the Mixed Committee of the League of Nations, but with double rations of cod-liver oil, eggs, and meat, she was quite altered, the hæmoglobin returning to about normal (without her

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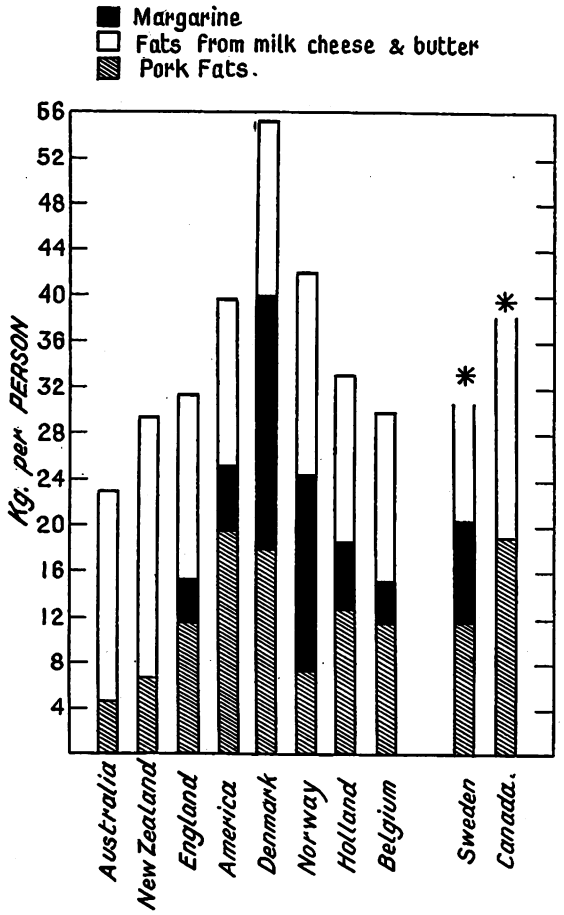

FIG. 1.—Consumption of fat in various countries. The exact figures for milk-fats for Sweden and Canada (marked with asterisk) are not known.

taking any extra iron), the gastric hydrochloric acid increasing, and her skin becoming softer. After a year's "protective food" the menstruation recurred.

All this patient's symptoms could be attributed to faulty nutrition: anæmia (lack of iron); gastritis subacida (lack of meat and ? vitamins B_2 and B_6); tiredness (lack of calories and albumin); headache and pain in the back and hips (lack of calcium and vitamin D; osteomalacia incipiens). Advanced cases of osteomalacia have been published by P. Schultzer and E. Meulengracht. About 50 cases of pellagra and numerous cases of pellagroid dermatoses have been published (Thaysen, Reiter, Jacobsen, &c.).

It is difficult to prove but it is probable that the so-called fat-infiltrations, painful subcutaneous "adiposalgias" which are perhaps the commonest "rheumatic" disease in Denmark, are in part due to the extravagant consumption of fat. I did not see this "Danish disease" among my Italian patients during three years of practice in Italy.

CONDITION OF TEETH AND BONES

The Danish diet is poor in vitamins A and D. The intake of calcium is high among the peasants because separated milk is taken largely, but probably the calcium from it is not properly utilised in the body when the cream and butter have been sent away to England, and not much whole milk is consumed. Facts about the incidence of dental decay are scanty; in 1894 and 1920 respectively 8 and 2 per cent. of the school-children in Copenhagen had entirely healthy teeth. Since 1920 the situation seems to have worsened (Tofte 1934), and it is supposed that only ½–1 per cent. of the children now have healthy teeth. About half the soldiers have very bad teeth. The number of conscripts rejected is increasing, rachitic deformities of the back and bones and flat-foot being common causes. In 1931 Brigade-doctor Louis Fraenkel wrote that deformed and ankylosed vertebræ (Scheuermann's disease ?) were frequent among the conscripts but that tuberculous kyphoses were rare. Between 1926 and 1931 not less than 15,504 of the 165,495 conscripts had misshapen backs of a serious degree; the young men from the country were worse than those from the towns. Brigade-doctor Chr. Struckmann (1933) gave similar facts, as follows:

	Conscripts with flat-feet—	
	From the country.	From the cities.
1930	12 per cent.	7 per cent.
1932	19 „	14 „

It was found that 11–13 per cent. of all conscripts had serious faults of their back. There is also a rise in the number of conscripts with varicose veins and mental stupor or slowness. Of course these facts have been much discussed, and it has been said that the curve of rejections has risen and fallen several times between 1895 and the present day without apparent reason. Rördam (1934) says however that the curve of rejections is of real value after 1909, and believes that the increasing number of rejections is a deplorable reality with serious causes. According to the statistical reports the percentage of rejections have been as follows.

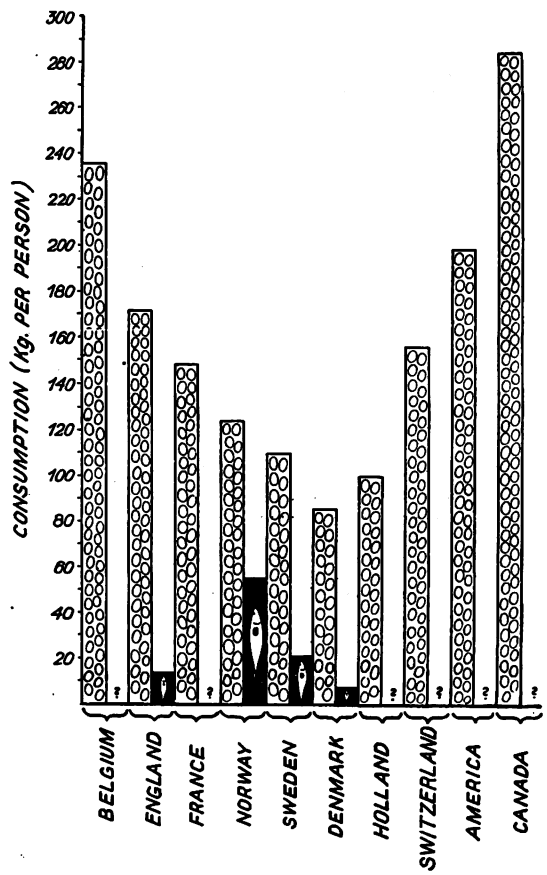

FIG. 2.—Annual consumption of eggs and fish in various countries, showing that the Danish consumption is low.

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1914–18	1919	1920	1921	1922	1923	1924	1925	1926
25·7	28·7	29·1	30·2	30·1	32·4	30·2	32·1	32·3
1927	**1928**	**1929**	**1930**	**1931**	**1932**	**1933**	**1934**	**1935**	**1936**
32·3	33·4	37·6	34·6	36·7	37·2	41·3	40·1	39·8	38·2

Rördam writes that it is commonly held that there are more rejections where the standard of living is low; in a little island (Sejrö) the young men are unusually tall and unusually misshapen. He

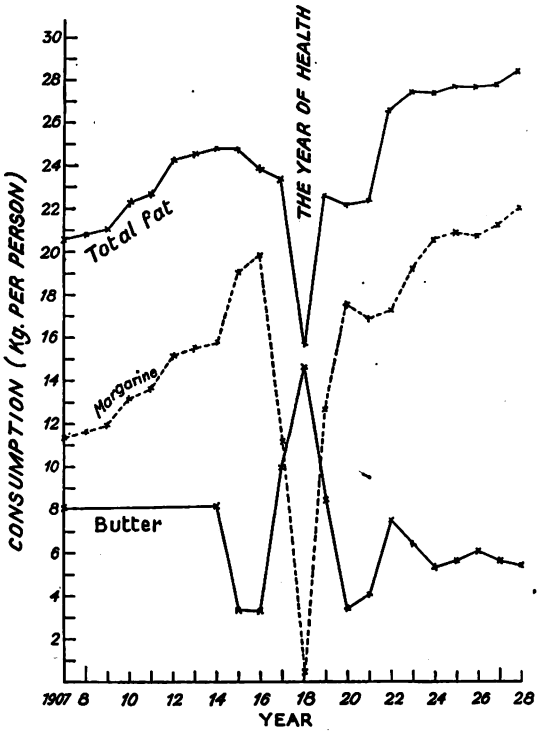

FIG. 3.—The year of health or "butter year," 1918.

emphasises that the number of absolutely rejected conscripts has nothing to do with the practical requirements of soldiering, because there is a medium category of conditionally rejected men. Furthermore, most conscripts wish to be soldiers, since rejection is a handicap for their future possibilities.

In Sweden, Finland, and Norway the proportion of rejections is much lower than in Denmark. The following information was given in the report of the congress of brigade-surgeons in Helsingfors:

Percentage of Rejected Conscripts, 1927

Denmark.	Norway.	Finland.	Sweden.
41·6*	25·2	20·4	17·7

* This figure includes rejections of men called up for service two or three times, and is therefore higher than the figure for 1927 given above, which comprises only recruits called up for service for the first time.

More than 25 per cent. of the rejected Danish conscripts suffered from diseases (? rachitic) of bones and articulations. In 1927 the incidence of diseases of bones, eyes, ears, heart, lungs, and stomach was much greater than in Sweden. In Denmark 16·6 per cent. of the conscripts had flat-foot, in Sweden 4·7 per cent. (in Germany, in 1935, 24 per cent.). But more mental disease and tuberculosis was recorded in Sweden than in Denmark. Of course it is difficult to be sure of the value of such comparisons. K. A. Knudsen, the former inspector of gymnastics, in an extensive investigation of 22,000 Danish children, found that half had so-called "Knudsen backs"—that is, stiffness and curvature of a definite but not very pronounced degree (Knudsen 1936). He also found similar backs in some English schools. Pronounced rachitic deformities are not so common in Denmark now as in earlier times because cod-liver oil is given when rickets is evident, but about 40 per cent. of the school-children have signs of rickets.

HEIGHT

The population of Denmark, like that of most other nations, has increased in height. Mackeprang (1910) has drawn up an interesting Table of heights of full-grown men (about 24 years old) for the beginning of the century (Table V).

TABLE V—AVERAGE HEIGHTS OF MEN OF VARIOUS NATIONS AT ABOUT THE YEAR 1900 (AFTER MACKEPRANG)

	Cm.		Cm.
Anglo-Saxons ..	172·5	Würtemburgers ..	167·5
Schleswig	172·0	Swiss	167·0
Sweden	172·0	Savoyards	166·75
Norwegians	171·5	Saxony	166·5
Holstein	170·5	Belgians	166·5
Danes	169·0	Austrians	166·0
Dutch	169·0	French	166·0
Alsace-Lorraine ..	169·0	Italian	166·0
Baden	169·0		

Of the Anglo-Saxons the Scots were the tallest; after them came the Irish, then the English.

It must be remembered that this Table represents different groups of individuals: most of them were conscripts; the Savoyards, French, and Austrian were soldiers (the rejected conscripts not being counted); and the figures for the Anglo-Saxons represent the average of 6194 Englishmen, 346 Irishmen, and 1304 Scots (report of the Anthropometric Committee 1883). The above summary is calculated on three suppositions: that between the measurements of all possible recruits and actual soldiers there is an average difference of about 1·5 cm., although this is doubted by Sören Hansen (1936); that from 20 to 24 years of age there is a growth of about 1 cm., and that the yearly increase of the height from the date of measuring to the year of comparison is about 0·07 cm.

The height of conscripts is of course of the greatest interest because all young men are measured. In countries without general conscription the height of the soldiers is not necessarily representative of the population; it has been claimed even that English soldiers are shorter in prosperous times because the taller ones have work.

Mackeprang also calculated that the height of fully grown Danes increased between 1854 and 1904 by 0·07 cm. yearly; and from 1904 to 1934 it has continued to increase at the same rate. The Swedes have increased by 0·08 cm. a year in the same interval, the Norwegians by some intermediate figure. If, as is generally assumed, increase in height means better nutrition, it is evident that the special faults of Danish nutrition are visible also in the slow increase in height in comparison with our neighbours just as our curve of infant mortality is descending more slowly than in Sweden and Norway. We are, however, approaching the height of our forefathers of 4000 years ago, which, according to Nielsen, was about 171 cm. for men and 157 cm. for women. These measurements were obtained from numerous skeletons found in Danish dolmens. Probably only people of the upper class were buried in those imposing sepulchres; the poor and the slaves were probably, then as now, not so tall as the well-nourished princes

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and knights and their families.* We may hope therefore that there has been real progress in the average height and nutrition in those 4000 years, although we must remember that height is only a rough index of nutrition.

Denmark with its rich pastures ought to be an example of good nutrition for other nations; instead of that we have become an example of how splendid possibilities of good nutrition can be spoiled, and progress in health retarded, by mercantilism and misleading propaganda.

SUMMARY

1. The Danish nation consumes more fat devoid of vitamins (margarine) and sugar per head than any other nation for which statistics are available. This faulty diet has a harmful effect on the national health. The infant mortality remains high in spite of great efforts made to lower it.

2. Hindhede's theory that the excellent health of the Danes during 1918 was due to a sparse and largely vegetarian diet enforced by war-rationing is not justified by the facts. During the rationing period the consumption of "protective foods" and animal proteins was in fact unusually great, for no margarine was available and the use of dairy products was much more widespread than usual. The theory of Bloch (1921) has been supported by recent statistical facts (1937).

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UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

THE A.M.A. POLICY

THE following resolution was passed by the board of trustees of the American Medical Association late in December, and is published in an editorial in the Association's *Journal* for Jan. 15th.

WHEREAS, A varying number of people may at times be insufficiently supplied with needed medical service for the maintenance of health and the prevention of disease; and

WHEREAS, The means of supplying medical service differ in various communities; be it

Resolved, That the American Medical Association stimulate the state and county medical societies to assume leadership, securing cooperation of state and local health agencies, hospital authorities, the dental, nursing, and correlated professions, welfare agencies and community chests in determining for each county in the United States the prevailing need for medical and preventive medical service where such may be insufficient or unavailable; and that such state and county medical societies develop for each county the preferable procedure for supplying these several needs, utilizing to the fullest extent medical and health agencies now available, in accordance with the established policies of the American Medical Association. Be it further

Resolved, That the Board of Trustees of the American Medical Association establish a committee to cooperate with the Bureau of Medical Economics in outlining the necessary procedures for making further studies and reports of the prevailing need for medical and preventive medical services; and that the Secretary of the American Medical Association arrange to develop such activities through the secretaries of state and county medical societies in each instance, urging the formation of special committees in each county and state where committees are not available for this purpose.

The editorial foresees the development of "a comprehensive system of medical care for all the people according to the American plan of medical practice."

I understand from a reliable source that the trustees have invited the "Committee of Physicians" to meet with them next month and to discuss with them the Principles and Proposals that were printed in your editorial of Nov. 27th.

REPORT OF THE COMMONWEALTH FUND

The nineteenth annual report of the director of the Commonwealth Fund for the year 1937 bears on its surface the hall-mark of excellence that characterises each undertaking of this foundation. If an award were offered, as surely one should be, for literary style and photographic illustration of annual reports, this report would certainly qualify for first place. One of the Fund's most praiseworthy activities is the publication of books "of scientific and educational character." No doubt the same editorial staff which has maintained the high quality of these publications has also made possible the preparation of this unusual report. The various activities of the Commonwealth Fund have been described in previous letters. In 1937 nearly $2,000,000 was spent, including $288,256 in fellowships for British students to study in American universities. This year for the first time the fellows have included men already employed in the home civil service. English physicians will read with interest a "sketch from the field" to learn how rural medical practice begins in a country where buying a practice is considered to be as unthinkable as buying a slave. We realise, of course, that the English do such things. The purchase of panel practices in your country is one of the well-known horrors of national health insurance.

RAPID METHOD FOR DEMONSTRATING NEGRI BODIES

The methods commonly employed here for staining brain sections for the demonstration of Negri bodies usually require 48 hours or more. Dr. J. Schleifstein of the division of laboratories and research, New York State department of health, has developed a technique which requires approximately 8 hours. Blocks of fresh tissue not more than 3 mm. in thickness are fixed in Zenker's solution for 4 hours at 37° C. They are washed in running water for 30 minutes. The blocks are then placed in dioxan containing a few flakes of iodine and supported therein well above a 1 cm. layer of anhydrous calcium chloride. This process occupies one hour in a well-stoppered bottle maintained at 37° C. The blocks are transferred to a mixture of equal parts of dioxan

* The Vikings were not so tall as the race living 4000 years ago. Guldberg (1901) found the average height of the skeletons of 33 Norwegian Vikings to be 166·6 cm. In the Middle Ages the height seems to have been less than this (Daae 1909).

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and paraffin and held for one hour at 56° C. After another hour in a paraffin bath at 56° C. they are embedded in paraffin.

The sections are stained with a modified Wilhite stain which makes possible ready identification of the Negri bodies regardless of size by the deep magenta colour with which they are stained. Atypically staining inclusion bodies have not been seen in specimens prepared by this method. Negri bodies have been demonstrated in brain tissue fixed as late as 48 hours after death when the heads had been kept on ice.

PARIS

(FROM OUR OWN CORRESPONDENT)

THE NEW CENTRAL COUNCIL OF SOCIAL HYGIENE

THE *Journal Officiel* for Jan. 13th has published an order by the Minister of Public Health creating a new Conseil Supérieur d'Hygiène Sociale, which is to take the place of the councils, committees, and commissions that have hitherto dealt with almost every conceivable activity in the field of health and public welfare. The list of formerly more or less independent bodies to be absorbed by the Central Council is amazingly long. Its length reflects the tendency within modern communities to meet most of the new problems confronting them by the appointment of a commission which forthwith becomes a watertight compartment full of experts. On the new Central Council are to be represented not only the absorbed bodies, but also a host of other activities, interests, Government departments, &c. Every Government ministry, from War to Labour, is to be represented, and every head of every department of the Ministry of Public Health is to attend the meetings of the Central Council in an advisory capacity. A fair sprinkling of distinguished laymen within the new council should help to widen its outlook and stir the brains of public health officials grown mechanical in the exercise of routine administrative duties. As a window-dressing achievement the list of members is remarkably effective. For on it are to be found practically all the Frenchmen whose work on public health within recent years has gained them some publicity. The new Central Council may, indeed, be said to be one of all the talents. The very profusion of talents makes one wonder how they can be fused into a single, efficient instrument. The *Journal Officiel* omits to tell us who will be the main driving forces within this new body, and as it is to be composed of seven different commissions, the achievements of each must be judged separately when an opinion is to be formed of the value of this Central Council as a whole. The commissions are to deal with tuberculosis, venereal disease, cancer, rheumatism, nursing, documentation plus propaganda, and coördination. The coördination commission will keep the council in touch with national sickness insurance.

CHANGES AT THE CURIE INSTITUTE

The retirement of Prof. Regaud from the direction of the radio-physiological and therapeutic departments of the Radium Institute in Paris marks the end of nearly a score of years' service devoted by him to this body. It was in 1919 that he was called on to take charge of these departments, and since then the progress made in this field has been closely associated with his name. His successor is Dr. Antoine Lacassagne, whom Prof. Regaud discovered and brought from Lyons to Paris. He has done valuable pioneer work in pathological anatomy. His father was Prof. Lacassagne, the well-known medico-legal expert.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A HOSPITAL PHYSICIAN

I

MY whole working day is spent in one of our hospitals, and this may explain why I feel more strongly than most other people about their place in the scheme of things.

Hospitals are essentially a service to the public, and we have become so familiar nowadays with the idea of development of such services by local or national government that one is led to wonder why, in this particular field, it has been only partially followed, and why there should be such firm opposition to it.

The reasons that have usually led to the superseding of privately organised endeavour by public authority have been (1) the general recognition of the value of the service performed, (2) the desirability of its nation-wide extension, and (3) the realisation that authority for its development and for the expenditure involved is too great to be safely borne by any group less than the elected representatives of the people. No doubt there were individuals who regretted the government adoption of elementary schools, of the infant welfare movement, even perhaps of the city fire brigades. The objection could be founded partly on sentiment, partly on fear of bureaucratic sterility and perversion, and in some degree on self-interest. Opposition to the organisation of medical services by public authority—in so far as it is raised by members of the medical profession itself—has undoubtedly all these motives; for example not long ago we find Dr. R. S. Barclay reported in THE LANCET as saying that it is not the legitimate sphere of the local authorities to "compete" with the voluntary hospitals. But there is a fourth motive, peculiar to the situation—namely, the fear of control by bureaucracy.

The professional ethic demands that nothing shall come between the patient and his medical adviser to destroy the confidence and freedom of action upon which life may depend. This ethic is displayed, in practice, by the protests of doctors in courts of law against compulsion to give evidence which they regard as confidential; though I cannot recall that the protest has ever been pressed as far as the lock-up. Fear of regimentation, of uninformed and domineering interference, of stereotyped remedies and methods, and of leakage of confidential information, are the objections raised, and it would be idle to pretend there is no justification for them. They have substance in the conditions obtaining in the medical branches of the defence forces, and in many departments of the civil service. Yet surely we ought also to consider

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whether the circumstances of *private* practice, and particularly of private specialist practice, are such as to ensure that professional integrity is intact and that full functional capacity is maintained, and secondly whether the dangers of organisation under public authority cannot be circumvented. Better, perhaps, a circumscribed than a functionless liberty.

The difficulties and temptations in the path of the newly launched private practitioner are great—the urgent need of a quickly established reputation and its maintenance, the difficulty of acknowledging mistakes, the temptation to give grave prognoses so that he may be considered to have saved his patient and the temptation to ascribe to his innocent medicine the curative properties he no doubt ardently desires it should possess. From accepting the eulogies of his recovered patient, it is a small step for the doctor to convince himself that he has in fact played an important part. Not only his satisfaction in the good day's work, but his comfort, and that of his family, and the education of his children depend upon his reputation among laymen as a "clever doctor." The surgeon too must be of strong character to be immune to the temptation to flatter the opinion of the practitioners who consult him, by performing an operation which in desperation they demand for the patient with neurotic pain; even if he is more easily able to resist the appeal to his pocket.

* * *

Until recently students in the medical schools were openly (and quite possibly sincerely) advised against the choice of permanent salaried appointments; there was not only a professional but even a social caste convention that lent force to such advice. The honorary appointment at the voluntary hospital is invested with a glory from which none of the disadvantages in respect of (often merciless) competition—with its inevitable angling for reputation, obligatory conformity to conventional behaviour, and the hard grind, often exclusive of valuable research—are seriously considered to detract. The public institution is often regarded with contempt and antagonism by the neighbouring "voluntary" hospital staff. What is the basis of this convention? Many a "consulting" specialist must, on his occasional visits to a public institution, have been surprised at the high level of work performed there, in spite of the immense difficulties imposed by the absence of case selection, parsimony in staffing, and the lack of good laboratory facilities.[1]

The truth is that, from very early days, men and women of considerable ability entered the service of public institutions, sometimes for the sake of an immediate income, sometimes from distaste for the competitive scramble of private practice; and lately, with the growing development of public hospitals, an increasing number of would-be specialists have taken advantage of the opportunities offered by appointments there. Nevertheless there is still a very strong tradition that success and proficiency in specialist fields of medicine depend on connexion with a medical school; its rationale is the association with research, or—on a lower idealistic plane—the idea that if a man can teach he must have studied his subject more or less profoundly. Teaching alone, however, contributes little or nothing to the understanding of disease; rather the reverse, since it tends to dogmatic thought. The concentration of scholarship and research in the universities is largely a matter of economics, and the tendency in science is increasingly to separate teaching from research and applied science, on the grounds that the obligation to teach is a serious hindrance to original work.

There is a more obvious origin for the belief that no successful specialist practice is possible detached from the schools—namely, the need, in private practice, to establish a reputation among students upon whom the specialist will later depend for his introduction to paying patients. Few consultants in London and the larger provincial cities can afford to be without honorary appointments; they are the sine-qua-non of commencing practice. The prevalent idea that great sacrifices are made on this account is somewhat naïve, for the competition is such that considerable sums would no doubt be paid by would-be consultants to obtain the coveted appointments.

This is not to decry the virtue of the "voluntary honorary" system in the past; at a certain point in the history of hospital development it was represented truly enough as a useful and even necessary instance of functional reciprocity, the specialist giving his gratuitous services to the poor and obtaining thereby the reputation which entitled him to fees from the rich. But a mutual advantage has been rather ludicrously exaggerated into a nobility of design which most honorary physicians and surgeons would disown. It is worth while to be realistic about this, since upon a false view of the situation is founded much of the sentimental attachment to a system. In his "Treatment of the Sick Poor" (1927) Dr. H. J. McCurrich is unkind enough to say of honorary appointments that "far from being acts of charity—these posts are eagerly sought and violent quarrels and base intrigues occasionally accompany their bestowal." There is often at all events, strenuous opposition on the part of "sitting members" to increased competition through additions to the staff.

* * *

In 1938 the professional ethic, so highly praised by R. H. Tawney in his "Acquisitive Society," is perhaps less conspicuous than professional etiquette. There is little or no teaching of ethics in the schools, where the practice of medicine is often realistically assessed as a good trade. The best recommendation for a partnership is not exceptional technical ability but cash down and conformity to upper middle-class standards in dress and behaviour. The qualifications, in fact, are those demanded of a partner in a business enterprise.

Private practice as we see it to-day is intimately related to the voluntary hospital system. And two-thirds of our profession are engaged in private practice. How far are the constant and determined efforts to buttress and extend the voluntary system and to oppose State-provided institutions and organisations founded on sound reasons, and how far are they founded on short-sighted conservatism and self-interest?

[1] "The guardians provide excellent buildings and appliances, yet when they come to the appointing of a staff to do the work, liberality of policy fails them and parsimony takes its place. . . . They are likely to adopt unknowingly a policy of sweating both as to the amount of work required and as to the payment made for it." Webb, S. and B. (1910) The State and the Doctor.

JOURNAL FOR THE STUDY OF OLD AGE.—Under the title of *Zeitschrift für Altersforschung* a new journal is to appear about four times a year which will epitomise original work published in any part of the world in the different specialties which has a special bearing on the problems of old age. The editors will be Prof. E. Abderhalden and Prof. M. Bürger, and the journal will be published by Theodor Steinkopff of Dresden and Leipzig.

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MEDICINE AND THE LAW

Ear-piercing at the Jeweller's

In Phillips *v.* William Whiteley Ltd. there was an interesting assessment of the degree of skill required of an unqualified, as contrasted with a qualified, practitioner. Mrs. Phillips was about to go into hospital for a serious operation. On the previous day she went to Whiteleys and had her ears pierced for the purpose of wearing ear-rings. This was a convenient arrangement because she knew she would have to wear some rather unsightly "sleeper rings" for some time after the piercing; she would get this stage over while in hospital. About ten days after her serious operation in the hospital, she suffered pain in the neck from an infected gland. On arriving home she consulted her doctor; eventually an operation was performed, leaving a small scar. She claimed damages from Whiteleys for the infected gland and its consequences, attributing these injuries to the negligence of the defendants in piercing her ear without due regard to cleanliness. It appeared that Whiteley's jewellery department arranged with another firm of jewellers for the services of a man named Cousins who was in the habit of piercing ears. Mr. Cousins said he had performed this kind of operation on about 150 people a year for the past ten years; it was an ordinary operation and it was only by an extraordinary bit of bad luck that anything was likely to go wrong. He sponged the plaintiff's ears with an antiseptic, dipped his own fingers in the antiseptic, and put his instrument into a flame. The defendants called a medical witness with high qualifications who said that Mr. Cousins's precautions were sufficient for practical purposes, though they did not represent the degree of surgical cleanliness which a doctor would use.

Mr. Justice Goddard seemed satisfied that the abscess from which Mrs. Phillips suffered was the result of her ear being pierced; but he could not find that it was due to any fault on the part of Mr. Cousins. The medical evidence suggested to the judge's mind that it was much more likely that the infection entered the ear at some period after the piercing than that it was due to the original use of a dirty instrument. The claim failed because Mrs. Phillips was unable to show that her injuries were due to negligence by Mr. Cousins. On the question of negligence, said the judge, Whiteleys were bound to conform to the standard of skill and care which might be expected of a jeweller. Jewellers were not obliged to undertake to observe the degree of surgical cleanliness expected of a surgeon who was conducting a major operation. If people wanted to secure that high standard of care, they ought to go to a doctor; if they went to a jeweller, they must expect the operation to be carried out as jewellers would do it.

Privacy for the Surgery

The Privy Council has lately been listening to an Australian petition for leave to appeal. It was the application of a racecourse company which was aggrieved because a neighbouring land-owner built a tower from which he could overlook the racecourse without the trouble or expense of going inside the gates. He and his friends got a bird's-eye view of the racing from the tower and could (with field glasses) read the results as the winning horses were announced on the boards. In addition he allowed a broadcaster to use his tower and to connect it with a broadcasting station for the purpose of a running commentary on the racing. The racecourse company complained that the takings at its turnstiles were diminishing. People stayed at home and listened instead of paying to come and look. In the argument before the Privy Council there was much legal dispute about the right of a man to be immune from being overlooked. The only case which seemed to favour the racecourse company was one, reported apparently in a text-book and not accessible in the ordinary law reports, where some evilly disposed persons had arranged a contrivance of mirrors so that they could indulge an inquisitive desire to see what went on in the surgery of a dentist next door. The dentist apparently was able to obtain an injunction to defeat this intrusion upon his privacy. It is reassuring to surgeons and physicians to know that they would not be entirely without legal remedy against neighbours who played the part of Peeping Tom or afforded the British Broadcasting Corporation facilities for a running commentary and even for television. But it would be interesting to find out more about the dentist's case. Is it a decision of the English courts and where can it be found?

The Australian company lost its application. Its main contention was that an adjoining land-owner ought not to be encouraged by law to make a non-natural use of his land to the annoyance of a neighbour. It had an alternative claim based on an alleged infringement of its copyright in the information about the racing results. Neither line of argument succeeded. The Federal Court in Australia had already refused to interfere and the Privy Council found no reason to take a different view.

YOUTHFUL DELINQUENCY

The Children's Branch of the Home Office, which has just issued its fifth report (H.M. Stat. Office, 2*s.* 6*d.*), is concerned in the main with delinquent children and young persons under 17 years of age. The department is in close contact with the Probation Department, the Board of Education, the Ministry of Health, the Prison Commission (re Borstal), the local health and education authorities, and the numerous voluntary organisations dealing with delinquent and problem children. The present report, which deals largely with the work of the department consequent upon the passing of the Children and Young Persons Act in 1933, shows a full appreciation of the need for elasticity in dealing with such highly individualised material as delinquents and will prove a stimulating example to the local authorities concerned, many of which, it is evident, lag sadly behind the central body in dealing with this group of social problems.

The Act of 1933, which governs the constitution of the special juvenile courts, provides certain new methods of dealing with juvenile delinquents. It is worthy of note (p. 5) that of 7005 of the justices on the panels of these courts 4064 are over the age of 60, 1413 over 70, and only 865 under 50. It is clear that there are many difficulties in the way of younger people sitting regularly on the bench, but it is hard to believe that this age-distribution is good for progress; medically, it is at least ten years too old all through. The well-known increase in juvenile delinquency is noted, but it is reassuring to observe that out of a population of some 3 million boys in 1935 only 24,000 were found guilty—almost all of dishonesty in some form. The new Act itself is in fact regarded as responsible for the sudden increase

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in 1934–35 owing to the stimulus it gave to interest in delinquency.

Stress is laid on the importance of such environmental conditions as the broken home in the ætiology of delinquency, though the research groups quoted are too small for generalisations. It certainly seems to be true of the approved-school population, and this may be a reason why these schools have such great success. It is also pointed out how mental backwardness not amounting to mental deficiency is a frequent factor; out of 400 boys in one approved school 54 per cent. were classed as dull on the evidence of intelligence tests. These figures (and others quoted) seem rather high when compared with ordinary clinic findings in delinquents in general and suggest that the approved-school population contains an undue proportion of mentally backward children. There is much medical opinion in favour of skilled and special training for such children away from home and it is in accord with medical experience that they do well in the schools.

CHILDREN INCUBATING DELINQUENCY

The report enumerates the various ways in which a delinquent child can be dealt with by the courts and most of these courses are open to certain children referred to as "in need of care or protection or beyond control." These latter have committed no offence but are being satisfactorily dealt with under the new Act. Much of the improvement in this respect is due to the new atmosphere of the juvenile courts in which publicity is minimised, the criminal taint has been largely removed, and the remedies are no longer punitive in aim but reformative, the word "reform" being interpreted as meaning "educate." The old reformatories and industrial schools have been reorganised as approved (Home Office) schools and the remand homes have been transferred from the police to the local authority. Medical men may now be less averse to advising recourse to the courts when consulted about certain difficult and delinquent children who seem impossible to control or cure without the use of superior authority.

Half the delinquent children found guilty every year are placed on probation and are only briefly reviewed in the report. About one-tenth are sent to approved schools. Their average stay in the school is two years and they may not be sent for more than three years except in special circumstances, and a similar restriction holds with regard to sending children under ten years. Observation of these children over the three years after discharge shows 85·7 per cent. successes for the years 1928–29–30 and 78 per cent. for the years 1931–32–33. The report believes these figures can be improved. Even allowing for a high spontaneous reform rate these figures are very encouraging, and imply considerable skill in the selection of cases. The falling off in recent years does not appear to be serious and is due in part to the general social conditions of the years 1931–32–33 which affected the selection of cases and so on. A great deal of sociological and medical data is collected and laid before the bench to enable it to make a decision. The information includes a medical report. Arrangements are by no means uniform and sometimes go oddly astray. Thus pregnant girls, grossly mentally defective boys, and others medically quite unsuitable were sent to approved schools.

PSYCHOLOGISTS' "ERRORS"

On the whole, psychiatry is inadequately represented, though generous acknowledgment is made of the great value in this field of modern psychiatry in matters of research, diagnosis, and treatment, but it is a little unfortunate that so much emphasis is laid on psychologists' errors. A timely warning is given against unqualified advice, but it would have been better still to list the clinics at which reliable advice could be obtained. Such a list is shortly to be issued by the Child Guidance Council. Recognition of the value of the psychiatrist is admitted in difficult cases; but cases which are not regarded as difficult may also benefit from such examination, and it would at least be useful for comparison to know the mental state of the failures and of the cases who came from satisfactory homes. It may be long before it is possible to examine the mental state of all juvenile delinquents. That so little is done is partly due to lack of facilities, especially in country districts, and partly to the variant views of the different benches. Some remand homes which have a psychiatrist attached overwork him to the extent that much of the value of his work is lost.

The methods used in the approved school may be called educational in the widest sense of the term and they include psychological treatment. Punishment is not much used and only given after careful consideration, especially any form of corporal punishment. A system of stopping of privileges and encouragement by rewards works well. It is a tribute to the schools that they inculcate a good social spirit and esprit de corps in a very awkward group of children. After-care is regarded as important and elaborate arrangements are made for it.

A RESEARCH COMMITTEE

The encouragement to be found in this report is supplemented by the news that a research committee under Prof. A. M. Carr-Saunders has been formed to inquire into the causes of juvenile offences, the reappearance of juvenile offenders before the courts, and possible improvement in methods of treatment. Investigation will be made at several centres in London, Liverpool, and districts where unemployment is rife. The years 1934 to 1936 will be particularly studied to discover what has been the effect of the Young Persons Act. The committee will be asked to report at the end of the year. Its report will help to adjust the balance of the present review, which naturally tends to overstress the purely sociological side of delinquency.

AN ASSOCIATION FOR PHYSICAL MEDICINE

A NEW society was inaugurated on Jan. 27th at 56, Russell-street, W.C., when the British Association of Physical Medicine met for the first time. Dr. P. DALTON, in the chair, said that physical therapy is becoming the medicine of the future. At present, however, physiotherapists are regarded as being of minor importance; in hospitals they come under the radiological department, and the only diploma in this branch of medicine is the D.M.R.E. He then set forth the ideals of the society:—

To coördinate the various branches of physical medicine under one control.

To coöperate with the manufacturers in the production of suitable appliances for medical and surgical use, and to prevent their sale to unsuitable people.

To promote a national register of those practising the science and to affiliate all appropriate bodies.

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To institute a chair in physical medicine in one or more of the universities and to establish a post-graduate school.

To establish contact with the general practitioner and to keep him informed of the changes in the subject.

To establish a technical board to act in an advisory capacity.

Dr. MONTAGUE WHITBY, honorary secretary of the society, elaborated these ideals. The growing importance of the subject, particularly in industrial medicine, makes it essential that there should be a united body that could protect their interests and support their claim to recognition as an organisation of highly trained workers. There is no official means, he said, of knowing how many specialists there were, because there was no register. The general practitioner, the pivot of the profession, knows little or nothing of the subject and sends his patients to technicians, who have to bear the responsibility of the treatment. Manufacturers would welcome the coöperation of a technical board to whom they could submit appliances for investigation. It is important, he concluded, that there should be some sort of union between the Association and the Society of Physiotherapy, a recently chartered body that has always worked under medical supervision.

Sir ROBERT STANTON WOODS criticised certain of the society's objects. Coöperation with the manufacturers may lead to misunderstanding, unless the Association acts in a purely advisory capacity. A university chair seemed very ambitious; its value has first to be proved to the rest of the profession. Instead of adding to the medical student's work, it would surely be more satisfactory to include the subject in a post-graduate course. Dr. KERR RUSSELL was in favour of a register as binding the members to concerted effort. It would help to raise the status of the physical medicine department in hospitals where it is at present regarded merely as a dispensary of treatment. Dr. D. HOWAT suggested that they ought to ensure that the sales of lamps are restricted to people qualified to use them. In hospitals light is too often regarded as the last resource when all else has failed. Mr. MORTON WHITBY, speaking as a genito-urinary surgeon, had found that it is sometimes possible to dispense with operative measures by means of physical medicine. He felt that it should be one of the objects of the Association to centralise this new branch of science; as in a nursing-home or hospital for middle-class patients. Dr. EVA WHITE thought that the Association should include anyone who was interested in the subject and not be limited to medical members.

It was agreed that associate members should be elected to the membership of the society. A medical advisory committee for manufacturers should be set up in conjunction with the National Physical Research Laboratory. It was also agreed to aim at securing a university chair and a diploma in physical medicine. A register of known physiotherapists is to be formed, but the elections were left over until the next meeting.

CORRESPONDENCE

TRANSFUSION OF LEUKÆMIC AND ERYTHRÆMIC BLOOD

To the Editor of THE LANCET

SIR,—In several recent articles the transfusion of leukæmic blood has been advised in cases of agranulocytosis. As spontaneous leukæmia in animals can be transferred to other animals of the same species, even by inoculation of a few cells, transfusions of this nature seem interesting as experiments rather than desirable as therapeutics. In this connexion I should like to ask whether anyone has seen ill effects follow the transfusion of erythræmic blood. Bleeding is a most useful remedy in erythræmia, and the concentrated blood is very effective when used for transfusion. Nevertheless erythræmia has some resemblance to leukæmia, and hitherto I have tried to restrict the transfusion of erythræmic blood to patients with incurable diseases.

I am, Sir, yours faithfully,

L. J. WITTS.

St. Bartholomew's Hospital, E.C., Jan. 21st.

INFANTICIDE

To the Editor of THE LANCET

SIR,—There can surely be no dissent from your general conclusion with regard to mothers charged with the murder of their children, that a prison hospital "is scarcely the ideal place" for their observation and treatment. While it is true that the husband or other relatives would nearly always dislike the certification of the mother or her commitment to a mental asylum, they dislike and resent far more the commitment of the mother to a prison hospital. It is really a scandalous thing that mothers, whose offence has been committed because of unbalanced mind *arising from any cause*, should be sent to a place of punitive detention and forced to consort with offenders of all degrees of moral culpability. The stigma and the memory of that experience remain and may be a very real hindrance to complete recovery and a lasting source of mental suffering.

One way out of the difficulty would be provided by the establishment of properly equipped observation centres, long advocated by the Howard League for Penal Reform as an essential in the scientific treatment of delinquency, where such cases as these could be kept in safe custody in surroundings without either the prison or the asylum taint. We are promised at least one such centre in the new Prison Bill, and their rapid extension over the whole country should be pressed for at the earliest possible moment.

It is unfortunate that Lord Dawson's Bill, so excellent in intention, should by its wording be so limited in scope. Surely, proof that the offence committed was the result of unbalanced mind should be sufficient, whatever the cause of the mental derangement and irrespective of whether or not the offence was committed within twelve months. The Bill, as drafted, would not have applied to more than one or two of the considerable number of cases in which mothers have been subjected to what has become known as "the black cap farce" during recent years. It is to be hoped that if it makes progress in the Lords its scope will be greatly widened by appropriate amendments.

I am, Sir, yours faithfully,

JOHN PATON,
Secretary, National Council for the Abolition of the Death Penalty.

Victoria-street, S.W., Jan. 31st.

THE MEDICAL PROFESSION IN NATIONAL EMERGENCY

To the Editor of THE LANCET

SIR,—The "national emergency" form sent out by the British Medical Association has been the subject of a good deal of criticism and discussion.

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Many medical practitioners have maintained that it was reasonable that some attempt should be made to coördinate the work of the medical profession in time of war. That this should be done voluntarily accorded with the best traditions of the profession. Others considered that there was a sinister purport in it all and that the form was inquisitorial. They felt that the political views of those who for one reason or another found themselves unable to fill in the required particulars would be suspect by the authorities. It was argued too that the General Medical Council, which already links the profession with the State, would have been the appropriate body to make the inquiry.

Now comes the letter in to-day's issue of THE LANCET which discloses an attempt to apply indirect coercion in a most offensive way, which smacks of Fascism. This anticipation of conscription creates quite the wrong atmosphere and can only arouse the distrust of those concerned.

It would be well for the British Medical Association to publish a full explanation and repudiation of this high-handed action; otherwise the sympathies of many members of the profession will be alienated from the scheme.

I am, Sir, yours faithfully,

LEONARD F. BROWNE.

Harley-street, W., Jan. 29th.

TREATMENT OF SCABIES

To the Editor of THE LANCET

SIR,—I see that the treatment of scabies with nascent sulphur receives further commendation in the report from your Budapest correspondent (Jan. 29th, p. 285), who describes it as "a new quick method." As this is the second occasion within the past few months that this form of treatment has been "discovered," I thought it would be worth while putting on record the fact that it was used by at least one Field Ambulance (102nd) during the late war. Whilst at Franvillers in the Somme area in the summer of 1916 we had a large number of patients suffering from scabies and it was found that the deposition of sulphur, obtained by wetting the skin with a solution of sodium thiosulphate, followed by the application of a dilute mineral acid, gave slightly better results than those derived from the traditional use of sulphur ointment.

I am, Sir, yours faithfully,

London, W.C., Jan. 31st. W. K. FITCH.

CARBOHYDRATE METABOLISM IN ANOREXIA NERVOSA

To the Editor of THE LANCET

SIR,—The article by Dr. Sheldon and Dr. Young in your last issue raises a number of matters for discussion. Most of these I propose to leave for treatment in a paper on the same topic which I have in preparation; but one or two points call for immediate comment.

A good deal of the reasoning in this paper is based upon a series of oral glucose tolerance curves which are considered to reflect changing states of glucose tolerance. Actually they are of types commonly encountered in debilitating conditions, including prolonged starvation, which lead to disturbed tonus of the alimentary tract, their occurrence being apparently due to irregular gastric discharge and to actual changes in the efficiency of intestinal absorption. I have, for instance, a set of three curves obtained at short intervals from a case of chronic cardiac failure, which closely mimic the three types included in this series. It is becoming widely recognised of late that oral curves alone cannot form a satisfactory basis for discussion.

Evidently with some feeling of this kind, Sheldon and Young performed an intravenous glucose tolerance test upon their patient and a "control" case—"a surgical convalescent." Unfortunately, this control curve is very far from normal; in fact at only one point (70 minutes) does it fall below the usually accepted renal threshold of 180 mg. per 100 c.cm. This mishap has led to the conclusion that the case of anorexia nervosa showed greater tolerance than usual, whereas in fact her curve is quite abnormally high (its area is more than twice that of one of my normal curves)—a state of affairs which is usual in these cases.

Confirmation of the view finally expressed, "that there is no need to invoke an endocrine explanation," may be derived from a study of the insulin sensitivity. Anorexia nervosa seems, in fact, to be purely a condition of inanition, usually psychogenic at first, presenting the morbid physical and chemical findings of persistent undernutrition.

I am, Sir, yours faithfully,

C. WALLACE ROSS,
Carline Harrold research fellow,
Jan. 31st. University of Birmingham.

SILICOSIS INQUIRY IN SOUTH WALES: A DISCLAIMER

To the Editor of THE LANCET

SIR,—During the past week several newspapers have published inaccurate accounts of the progress of the investigation into silicosis in the South Wales coalfield which is being promoted by the Medical Research Council with the assistance of their Industrial Pulmonary Disease Committee. These include a statement attributed to "a member of the Pulmonary Diseases Board" (apparently meaning one of the investigators working under the direction of the Committee), to the effect that the results of the inquiry will make possible an immediate reduction of over 80 per cent. in the incidence of silicosis in the anthracite coalfield. The facts are that the investigation is still in an early stage; that the results cannot yet be assessed; and that no such opinion as that purporting to be quoted has been formed. No interview has been given to the press, and the alleged statement has not been made by the investigators.

I am, Sir, yours faithfully,

E. MELLANBY,
Feb. 1st. Secretary, Medical Research Council.

CONTROL OF A TYPHOID EPIDEMIC

To the Editor of THE LANCET

SIR,—Dr. Richard Taylor suggests in your last issue that mass inoculation of the Basque children prevented a major epidemic. Might I be allowed to point out that according to Dr. Taylor's own account of the camp the fifth and last case of typhoid amongst the children was diagnosed on June 4th, 1937, and no inoculations were performed until June 6th. As all the children had arrived at the camp by May 24th, thirteen days before the inoculations were started, and as the most insanitary period of the camp was during that thirteen days, why should inoculation be given any credit for preventing typhoid? If the children's filthy habits were likely to cause an outbreak of typhoid, the disease would have been contracted during those thirteen days.

With regard to the sanitary arrangements, Dr. Taylor himself wrote as follows (*Brit. med. J.* 1937 **2**, 760):

"The latrines were provided with narrow trenches, which were disinfected several times daily with

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chloride of lime. Hedges and ditches were treated in similar fashion and burnt out. Garbage was collected and burnt in incinerators. Some stagnant pools were drained and a stream which ran through the camp to Eastleigh was made to percolate through a chloride of lime contact-bed. The drainage system of the old manor house at Moorhill was investigated and improved. As a result of these precautions flies were exceedingly scarce.... Lessons in camp hygiene were given to the Spanish teachers and priests. The children were fed in large marquees and forbidden to take food away. Pails of dettol solution were provided outside all food tents and kitchens. The children and camp personnel were trained to wash their hands before and after meals."

It is evident from Dr. Taylor's own account of the matter: (1) that the provision of uncontaminated food and water; and (2) that the strenuous efforts made to ensure the sanitation of the camp prevented an outbreak of typhoid.

I am, Sir, yours faithfully,

REGINALD F. E. AUSTIN.

Queen Anne-street, W., Jan. 29th.

VITAMIN D_2 AND VITAMIN D_3

To the Editor of THE LANCET

SIR,—In your issue of Jan. 22nd, the admirable leading article contains one small error. Brockmann is therein reported to have used vitamin D_3 in doses one-half and two-thirds of the amount of vitamin D_2 stated (by him) to be commonly used in Germany—namely, 0·2 mg. (8000 international units) per day for a child of 10 kg. body-weight.

Actually, Brockmann's two doses were in the ratio of two to one, and not of three to two; the confusion is due to his ambiguous use of the phrase "half that amount," which actually refers to his own upper dose and *not* to the current dose of vitamin D_2. The difference, in view of the unsatisfactory nature of Brockmann's evidence, so well exposed in your article, is of no practical significance, but the correction may perhaps be made in the interests of historical accuracy.

Might I be permitted to add that the work of Lewis (*J. Pediat.* 1937, **10**, 155), which you do not mention, confirmed on a large group of children the earlier work of Eliot et al., although curative treatment of a much smaller group appeared to indicate some superiority of vitamin D_3? As none of the groups in Lewis's curative experiment contained more than four children, his conclusions, which are only tentatively drawn, must be treated with reserve. Actually, only two children received vitamin D_2 (Viosterol).

Finally, may I suggest a slight revision of the present dichotomy between "natural" and "artificial" vitamin D? Vitamin D_3 has been prepared in the laboratory by the irradiation of 7-dehydrocholesterol—a process no less, and no more, "artificial" than the preparation of calciferol from ergosterol; calciferol (vitamin D_2) occurs "naturally" in the husk of the cocoa-bean, in certain moulds and fungi (including ergot of rye), and probably in many vegetable oils, if only at a very low concentration. If we must make adjectival distinctions between vitamin D_2 and vitamin D_3, it would be more instructive and quite accurate to call them respectively *vegetable* and *animal* vitamin D.

I am, Sir, yours faithfully,

A. L. BACHARACH.

Glaxo Laboratories Ltd., Greenford, Middlesex, Feb. 1st.

THE LONDON M.B. FINAL

To the Editor of THE LANCET

SIR,—The fact that so many university candidates stop short at their intermediate and do not proceed to their final medicine has been pointed out lately in your columns. There is a very obvious reason for this. It will be granted that by far the larger number of students will eventually earn their livelihoods in ordinary general practice. Now although academic distinction is gratifying to the recipient, financial success is the leading issue. Higher qualifications are a necessity to the man who intends to apply for public appointments and the like, but it may well be asked of what use are they to the average practitioner. The general public know little or nothing about their relative value and significance, and they care less.

The import of higher qualifications was further levelled when some years back legislation was brought in permitting anyone, with any professional qualification at all, to use officially the title of "Dr." So nowadays we are faced with the anomaly of the gentleman who can only lay claim to an apothecary's qualification proudly printing "Dr.——" on his plate and lamp. While anyone with a double or triple diploma further enforces his claim to recognition by having "Dr.——" on his lamp and "Physician and Surgeon" on his plate. Why then waste time and money sitting for the finals when for ordinary general practice (in ninety-nine cases out of a hundred) one qualification is just as good as another? Much better get into practice quickly and learn from the successful a little of their business acumen and showmanship. For as Samuel Gee once said "By medical terms we can deceive anybody, from a pauper to a prince."

I am, Sir, yours faithfully,

Jan. 27th. G.P., M.D. Lond.

PARLIAMENT

NOTES ON CURRENT TOPICS

Reassembly after Christmas

BOTH Houses of Parliament reassembled on Feb. 1st after the Christmas recess.

QUESTION TIME

TUESDAY, FEB. 1ST

Water-supply

Mr. KELLY asked the Minister of Health the number of areas that in 1937 reported water shortage; and what steps had been, or were being, taken to save these areas from water famine in the future.—Sir KINGSLEY WOOD replied: In 1937 I received reports of shortage of varying degree from 4 boroughs, 4 urban districts, and parts of 16 rural districts. In 7 of these additional supplies have been provided, and in the remainder I am in communication with the local authorities on the remedial measures required.

Housing Requirements

Mr. DAY asked the Minister of Health what statistics his department had showing the present housing requirements in England and Wales, and what was the present housing shortage; if he would also give particulars of any estimate his department had made for improvement; when it was anticipated that the population of England and Wales would be satisfactorily housed; and was it considered that the present rate of housing construction was in excess of normal requirements.—Sir KINGSLEY WOOD replied: The number of houses required to complete the present slum clearance and overcrowding programmes is estimated at about 400,000. Those programmes will take approximately five years to complete. An estimate of the houses required for the general needs of the population is contained in the Census of England and Wales, 1931, Housing Reports and Tables published in 1935. As regards the last part of the question, I am not clear what precisely the hon. Member has in mind when he refers to "normal requirements," but it is not at present practicable to forecast what rate of house construction will be required when the slum clearance and overcrowding programmes have been completed.

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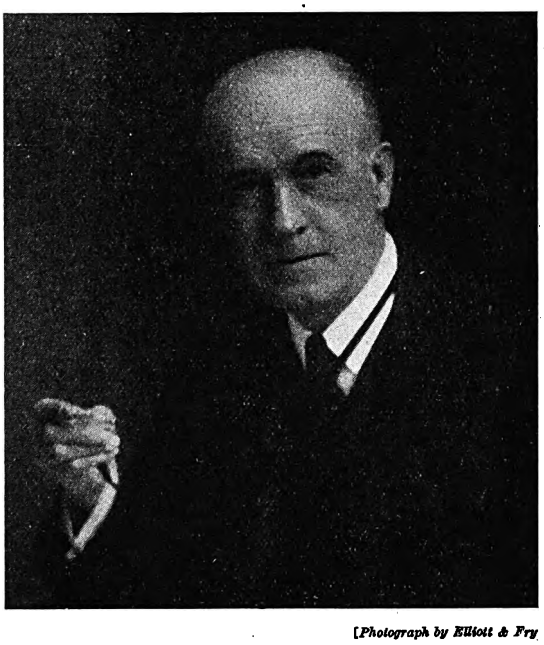
OBITUARY

SIR THOMAS STANTON, K.C.M.G., M.D. Toronto, F.R.C.P. Lond.

THE post of chief medical adviser to the Colonial Secretary was created for Sir Thomas Stanton in 1926, and for the last eleven years of his life he did a great deal to enhance the influence of medical science on colonial administration. Though he has died at 62, with several years of office ahead of him, he lived long enough to realise, by patient and self-effacing effort, some of the aims he had formed during prolonged contact with the actualities of the tropics. The chief of the Colonial Medical Service had earlier been the author of classical investigations in the field, and it required a man of high quality to do so much good work in these two different capacities, and win so much affection.

Ambrose Thomas Stanton was a Canadian and after graduating in medicine from Trinity Medical College, Toronto, in 1899 he spent several years in hospital work before coming to England to take an English qualification in 1905. In London, at the Hospital for Tropical Diseases, he found himself house surgeon to Sir Patrick Manson and in due course he was to become one of the most astute and original of Manson's lieutenants. From a demonstratorship in the medical school he was recommended for an assistantship in the Institute of Medical Research at Kuala Lumpur in the Malay States. In 1907, with the late Henry Fraser, director of this institute, he began a series of investigations, described in numerous contributions to THE LANCET, which proved that beri-beri is due to the absence of something contained in the husk of rice—a discovery demonstrating a new type of disorder, a "deficiency disease," of which much has been heard since. The idea that the absence of an element from the dietary could be a positive factor in the causation of a disease was then a novel and revolutionary one, and though the work was undertaken at Manson's instigation it represented a big departure from his conception of the disease as a form of toxic neuritis, like that of alcohol or diphtheria.



[Photograph by Elliott & Fry

Fraser and Stanton's earliest observations were made on two groups of coolies employed in building a road through virgin jungle. One of the groups was supplied with polished rice, the other—working some three miles distant—with parboiled rice. During this experiment Stanton lived for the best part of a year in a little thatched hut which stood in a clearing in the jungle at the dead end of the new road; many miles from civilisation and its comforts. Here he kept a look-out for cases of beri-beri among the coolies, and dispatched daily specimens of their food, sealed up in wooden boxes, to Fraser in Kuala Lumpur. This remote spot, surrounded by high, impenetrable jungle, was chosen to eliminate any possibility of infection, and because there was no opportunity in such a place for the coolies to obtain any food except that which was supplied to them. Stanton's life was terribly lonely and monotonous, but as a result of their labours Fraser and he were able to show that beri-beri was a disease of metabolism due to the consumption of a staple diet of rice from which the outer layers had been removed by polishing. They found that these subpericarpal layers contained certain "alcohol-soluble substances, minute in amount but of high physiological value in nutrition"—the substances to which Funk, a few years later, gave the name of vitamins. The influence this pioneer work has had on pathology and therapeutics needs no emphasis.

The inquiry into the prevention and cure of beri-beri went on until the beginning of the late war, and in 1924 Fraser and Stanton's findings were republished in one volume under the title of "Collected Papers on Beri-beri." To quote from the preface of this book, "the application in practice of the scientific principles evolved by these researches has been attended by a notable success. Beri-beri, which was formerly a scourge in the Orient, is now well on the way to extinction."

Stanton was a keen entomologist, and some consider that his work on mosquitoes was as valuable as his work on beri-beri. The identification of mosquito larvæ has become so much a matter of course in malaria surveys that his pioneer work in this connexion is almost forgotten; but, without it, the difficulties of anti-malaria work in the Malay States would have been insuperable. His name is also associated with a fatal disease which appeared in 1917 among the labourers on rubber estates and caused alarm among the public. The outbreak was thought at first to be the result of toddy-poisoning, but Stanton showed that it was due to infection with the organisms of a glanders-like disease which he afterwards named melioidosis. This fine piece of pure bacteriological research was republished in more extended form as a monograph with Dr. William Fletcher in 1932.

At the beginning of the war almost the whole of the European staff of the Kuala Lumpur institute were seconded for service, and Stanton was left to carry on in Malaya. We are told of "his wisdom and efficiency, his readiness to help, his steadiness, and his cheerfulness." In 1920 he was appointed director of Government laboratories in the Federated Malay States. Here his good judgment led everyone to seek his advice in every kind of difficulty. "When I first went to Malaya nearly thirty years ago," writes Dr. Bernard Day, "the staff of the Institute of Medical Research in Kuala Lumpur consisted of Fraser, Stanton, and Fletcher, three men of

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outstanding ability. The 'I.M.R.,' especially, perhaps, when Stanton was the director, was a place to which every doctor, whether in the Government medical service, or, like myself, in private practice, instinctively turned in the perplexities of our practice. Stanton had that rare gift of always making one feel that the particular problem which one brought to him was of great importance, and would spare himself neither time nor trouble to help one; and I, for one, never went empty away. Although, until the past eleven years when he was the head of the Colonial Medical Service, he was for the greater part of his career a laboratory worker, one always felt he was a first-rate clinician, and on many occasions in discussing a difficult case with him he was able to make a brilliant diagnosis without ever having seen the patient. No one I have ever met better followed the maxim 'Audi alteram partem,' and he found the best there was in everyone with whom he came in contact. In my judgment he was nearer the embodiment of Kipling's 'If' than anyone it has ever been my privilege to know."

The powers of organisation displayed at Kuala Lumpur were given greater scope when Stanton returned to England. His new appointment demanded not only knowledge but firmness, and it was one of his great achievements that he secured and kept the personal friendship of the many members of the Colonial Services, both lay and medical, with whom he had dealings: the medical officer returning from abroad could feel sure of a welcome at the Colonial Office. A younger man who came into contact with Sir Thomas as a senior civil servant tells us that he never stood on ceremony or thought of his own position: "in his youthful outlook and courtesy to juniors one was reminded of Sir Clifford Allbutt." He thought the best of other people, but was none the less accounted a good judge of them. In the discharge of his own duties he was conscientious to a degree, and if he made light of the burdens of his office it was not because he did not feel them heavy upon him.

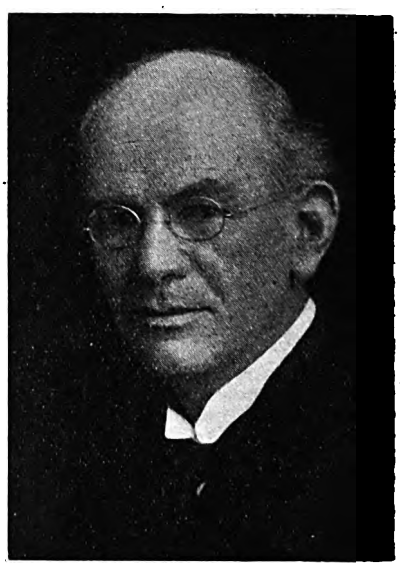
Stanton strongly believed that the welfare of the inhabitants of tropical countries depended on efficient coördination between the medical, agricultural, veterinary, and educational departments and he took active steps to ensure it. It was natural, with his background, that he should also be keenly aware of the importance of under-nutrition among native populations, and he had much to do with the formation of the Economic Advisory Council's committee on nutrition in the Colonial Empire. Part of his duties was to act as a liaison officer between the Colonial Office and various medical bodies outside, and this he was well fitted to do. He was chairman of the Colonial Advisory Medical Committee and of the managing committee of the Bureau of Hygiene and Tropical Diseases. He was a member of the board of management of the London School of Hygiene and Tropical Medicine, of the tropical medical research committee of the Medical Research Council, and of the British Empire Leprosy Relief Association. He was responsible for advising the Secretary of State on the many medical problems that require solution in the fifty-odd Crown Colonies, each with its separate government and financial problems, and during his tenure of office great progress was made in the medical services of these Colonies.

It was natural that many honours should come to Stanton, though some have felt that for his work on beri-beri he never had due credit. He received the Craiggs research prize of the London School of Tropical Medicine in 1911, the Mary Kingsley medal of the Liverpool School of Tropical Medicine in 1929, and the Bisset Hawkins prize of the Royal College of Physicians of London in 1926, when he was elected a fellow. He was created C.M.G. in 1929 and promoted to be K.C.M.G. in 1934. As late as 1922 he took the trouble to acquire a D.P.H., having secured a tropical diseases diploma in 1906. No distinction, however, pleased him more than the honorary degree of D.Sc. conferred by his old university, Toronto, four years ago.

Sir Thomas Stanton married in 1930 Dr. Elizabeth O'Flynn, M.R.C.P., who survives him. He died in London on Jan. 25th after a very brief illness.

CHARLES PARKER, F.R.C.S. Edin.

Charles Arthur Parker was the son of the Rev. Richard Parker of Claxby-cum-Well, Lincs, and was born there on May 28th, 1863. He went to school at Oxford and at Bradfield College, entering St. Bartholomew's Hospital in 1882 and qualifying four years later to become house surgeon to Sir William Savory. This was followed by a similar appointment at the Throat Hospital in Golden-square, which set the direction of his professional life as a laryngologist. He then married Katherine Eleanor Borradaile Kensit, and started in general practice at Rickmansworth, retaining his connexion with Golden-square as clinical assistant, until in 1893 he was elected assistant surgeon at the hospital. "As R.M.O.," writes one of his colleagues, "Parker had gained the esteem and friendship of the staff and was equally popular with nurses and patients. Hence although at the time of his election there were other candidates with higher academic qualifications, some of whom later became his colleagues, I doubt if any one of them begrudged him his success. Later in life he was a popular president of the section of laryngology, R.S.M. Parker served the Throat Hospital faithfully for twenty-five years; he was for many years dean of the medical council and a member of the committee of management. He worked hard as dean, was a good organiser, a successful teacher, in all things loyal to his colleagues, and entirely void of self-seeking. Naturally his colleagues trusted him, and although he held strong and often provocative opinions he never made an enemy amongst them. His weakness lay rather in his sympathy with the under-dog, which led him to promote the man who worked faithfully to a place beyond his capabilities. He was too straightforward himself to suspect guile in others. When Parker took up laryngology it was



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in the hands of physicians, few of whom ever attempted to operate. Soon afterwards the specialty was recognised as a branch of surgery and surgeons were taking it up. This militated heavily against his success; he had given up the practice of surgery for some years and was diffident of his surgical capabilities. Consequently he never undertook the larger surgical procedures which soon became the common work of his colleagues, although he performed with great success all the smaller operations on the nose and throat to which he was accustomed. His true bent was shown in his 'Guide to Diseases of the Nose and Throat and their Treatment' (1906), largely devoted to the medical treatment and the care of the patient in which he excelled. He also published some original observations on the air currents in nasal respiration. If his private practice never became large his patients trusted him and many of them became personal friends. That he did not attain the full success he merited may have been partly due to his disregard of appearances; he refused to conform in such matters as dress with the conventionalities of the age and scorned any effort to pose as the successful consultant. In these matters he was before his time."

But Parker's horizon was never bounded by his practice; he had always in mind the trend and policy of medicine, the public health, and the standard of medical education. From his earlier days in general practice he saw the dangerous gaps that so often yawned in medical practice; how the beginnings of disease went untreated because medical and surgical aid was not freely open to all; how an operation or a serious illness might deplete the resources of a family and jeopardise the health of its other members. Thus the idea of a State medical service gradually began to take shape in his mind. The other side of the picture he was apt to put, as he said, "with brutal frankness": that every doctor was in competition with every other doctor to get customers for his stock-in-trade, his very bread-and-butter depending on his success. Moreover, the doctor was also in competition with the community, which did to some extent recognise its responsibility for the health of the nation and was, as he held rightly, taking on its shoulders first one thing then another. The competition that he envisaged was of another kind, that of "a great army of doctors, who, whilst working shoulder to shoulder to eradicate disease and obtain a high standard of national health, will nevertheless compete with each other for promotion in a State service by giving to the community their best work for the advancement of the science and art of their calling." In association with Dr. Jane Walker and the late Benjamin Moore he drew up the constitution of such a service which, after a long period of quiescence, came to life again in 1930 as the programme of the National Medical Services Association. In the meantime Parker's vision had influenced an increasing circle of thoughtful persons who scarcely grasped the full implication of his teaching. And contrariwise Parker welcomed the dawn of his ideals in many unexpected quarters.

After giving up his London practice in 1923 Parker retired to High Wycombe, where he had been living for ten years or more, and was elected to the town council, representing the Labour interest in the eastern ward until 1928, when he had the first attack of coronary thrombosis which restricted his many activities. But he maintained his active interest in the technical institute there and in the Workers' Educational Association of which he had been in succession secretary, treasurer, and president. Having been county medical commandant of the Bucks volunteer defence corps, he became divisional surgeon when this unit was converted into the High Wycombe division of the St. John ambulance brigade, later being appointed serving brother of the Grand Priory. His long and painful illness—he suffered from intermittent claudication—he bore with unflinching courage, and even cheerfulness, although the restriction of his activities was made harder to bear by increasing loss of sight. He never complained and was a delightful and interesting companion who will be more missed than he himself would have thought possible.

Dr. Parker died rather suddenly on the early morning of Jan. 26th at the age of 75. For 47 years he had had the happiness of being associated with a wife who shared his literary and social interests. He leaves her with a son and a daughter.

ROBERT ENWRAIGHT LAUDER, M.D. Durh., F.R.C.S. Edin., D.P.H.

MANY men in the public health service will learn with regret of the death on Jan. 19th of Dr. R. E. Lauder in his 74th year. For over thirty years medical officer of health for Southampton, he played the chief part in the development of its medical services, always alive to recent advances and always keen to adopt any measures which would further their application. The X ray unit in the tuberculosis clinic was one of the first in the country and he welcomed the Act of 1929 for the liberty it gave the local authority to extend its hospital services. The same alertness was shown in every sphere of his administrative work and the smoothness with which the whole was operated showed not only his mastery of detail but his ability to obtain that coöperation, both inside and outside a department, which is so necessary to success.

Dr. Lauder qualified at Edinburgh in 1886 with the gold medal in medicine and surgery, going on to take higher distinctions. In the South African War he commanded a detachment he himself had raised and on his return was elected a freeman of the borough. At the beginning of the Great War he found himself suddenly called upon to undertake many new duties. Much additional hospital accommodation was necessary and he found it and from its inception he acted as colonel commandant of one of the large V.A.D. hospitals. He took a great interest in the work of the Southampton Medical Society and of the Southampton division of the B.M.A. and came to preside over both bodies.

D. F. writes: Lauder was a kindly man and his old colleagues well remember with affection the low rumbling voice which usually ended an argument, or a friendly piece of advice with a "Do you follow me?" Much sympathy will be extended to his widow and six daughters and to his son, Surg.-Lieut. R. E. Lauder.

JOHN ADAMS, F.R.C.S. Eng.

THE death of Dr. John Adams last week at his house in Aldersgate-street removes a medical man whose association with the City had almost become a legend. For sixty years his practice in the City of London had included merchants, financiers, and city officials of every degree, from the Lord Mayor to the office boy, and a new patient was another added to his circle of friends. The fourth son of a yeoman farmer in South Devon he retained throughout life

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his interest in the outdoor life and West-country doings. In 1869 he followed his elder brother James to St. Bartholomew's Hospital where he qualified in 1873, taking the F.R.C.S. fifteen years later. Immediately after qualification he became house physician to James Andrew, then resident midwifery assistant under Robert Greenhalgh, and he acted temporarily for a period of six months as casualty physician. He started practice as medical officer to the Royal General Dispensary in Bartholomew-close, to which he eventually became consulting physician and chairman, and then moved into Aldersgate-street, a stone's-throw away. In the City his activities were numerous. He became president of the Hunterian Society and chairman of the City division of the B.M.A. He joined in the civic life and became master of the Tinplate Workers' Company. Among his minor appointments he was surgeon to the City Waiters' Provident Society, to the Hospital for Sisters of the Poor in Paul-street, to St. Margaret's Hospital, Kentish Town, and to the Fishmongers' Hall Hospital for Officers. In 1908 he joined the R.A.M.C. section of the Territorial Army and during the war reached the rank of full colonel. It was then that he became interested in the transference of syphilis from an infected mother to a new-born child and entered enthusiastically into the study of this subject at the Thavies Inn centre and the Sheffield Hospital. This work led him to the conclusion that syphilitic pregnant women could be treated advantageously with salvarsan up to the day of confinement, and that a mother whose blood gave a positive Wassermann reaction might after treatment be delivered of a child whose blood was negative. This, if not new theory, was quite new practice, as also that syphilitic children could safely be treated by salvarsan immediately after birth.

Adams was especially beloved by the staff of the hospital near which he lived. To many generations of St. Bart's men he was known as "Father John." It was his habit to amble around the hospital discussing all sorts of topics with the medical staff and the lay authorities, showing the lively interest which eventually led to his being made in 1904 a governor of the hospital and serving on many of its committees.

He was in his eighty-seventh year, and is survived by five daughters and two sons.

WILLIAM BERTIE MACKAY, C.M.G., M.D. Edin.

Dr. William Mackay, who died in his car outside his house in Berwick on Jan. 23rd, was 74 and had only recently retired from a practice of over 50 years in the town. The son of J. R. Mackay he was educated at Edinburgh Institute before proceeding for his medical training to the University, where he graduated with honours in 1884. Three years later he joined the staff of the Berwick-on-Tweed Infirmary as surgeon, a post which he held until his retirement in 1934. Berwick will miss him not only as a doctor but also for his connexion with its municipal and civil life. He was sheriff for the burgh and J.P. for the county and borough, and was granted the freedom of the town. Keenly interested in the volunteer movement he served abroad throughout the war, first with the B.E.F., and was mentioned three times in dispatches, becoming lieutenant-colonel and later receiving the C.M.G. He married Jessie, daughter of the late Alderman Darling, who survives him with three sons and two daughters; his son Ian had been in partnership with him for some years.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 22ND, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2459; diphtheria, 1737; enteric fever, 19 (27 "expected"); pneumonia (primary or influenzal), 1321; puerperal pyrexia, 189; cerebro-spinal fever, 30; acute poliomyelitis, 8; encephalitis lethargica, 6; dysentery, 250; ophthalmia neonatorum, 100. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Jan. 28th was 4328, which included: Scarlet fever, 788; diphtheria, 1429 (carriers 32); measles, 655; whooping-cough, 307; puerperal fever, 24 mothers (plus 12 babies); encephalitis lethargica, 282; poliomyelitis, 0. At St. Margaret's Hospital there were 17 babies (plus 4 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 48 (3) from measles, 0 (0) from scarlet fever, 20 (2) from whooping-cough, 36 (3) from diphtheria, 69 (14) from diarrhœa and enteritis under two years, and 73 (12) from influenza. The figures in parentheses are those for London itself.

Sheffield reported the only death from typhoid. Liverpool again had 19 deaths from measles, Salford and Bristol each 3. Liverpool also reported 6 deaths from whooping-cough, Birmingham 4. Diphtheria was fatal in 24 great towns, Liverpool reporting 6, no other great town more than 2.

The number of stillbirths notified during the week was 284 (corresponding to a rate of 40 per 1000 total births), including 41 in London.

THE LANCET 100 YEARS AGO

February 3rd, 1838, p. 672.

From a report of a meeting of the Royal Institution on Friday, Jan. 19th, 1838.

PROFESSOR FARADAY ON ELECTRIC INDUCTION

THIS was the first evening meeting of the members for the season, and exhibited a "grand re-union" of scientific men. Dr. Faraday having made a series of experiments to ascertain the true laws of *induction* before the *Royal Society*, the results of which are now in course of publication by that learned body, repeated this evening several of the series, and presented them as a *bonne bouche* to the scientific gourmands who patronise Faraday's exquisite *cuisine*.

No science, according to the lecturer, has ever made so rapid a progress as electricity, and none has been so much retarded by the assumption of hypotheses, which the world at large have received with the most complacent gullibility. It was stated, as an indisputable principle, by Œpimus, and admitted by Cavendish and Pauillet, "that the action of electricity is in right lines, and with a force inversely as the square of the distance," like common forces: and that air, glass, or other interposing substances, act as impediments to its transmission. Faraday controverts this theory altogether, and labours by his experiments to prove, that electric induction is not produced by a force acting in right lines, but in curved or angular lines as well; and that it is not transmitted through empty space, but can alone be communicated from one body to another by the successive polarisation of contiguous molecules. . . .

At the conclusion Mr. Faraday congratulated the members upon the improved appearance of the mansion, a handsome Corinthian colonnade having been erected on its front. He also alluded to a vulgar error, which was going the round of the newspapers, "that salt was a desirable means of removing ice from the pavement." This he thought a most dangerous plan, by which dry ice of the temperature of 32 degrees, was converted into water at zero, a footing not at all agreeable in his opinion.

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MEDICAL NEWS

University of Oxford

A Radcliffe medical fellowship has been established at University College, out of the surplus income of the Linton fund.

The fellowship is open to all graduates of medicine and it will be combined with a prælectorship in medical science. The fellow will be responsible for teaching in physiology and biochemistry in the final honour school, and for the supervision of members of the college reading biology and medicine. He will receive not less than £450 per annum, together with rooms in college where he will be required to reside during full term. Further information may be had from the Master, to whom applications should be sent by April 30th.

University of Cambridge

The Raymond Horton-Smith prize for 1936–37 has been awarded to Dr. L. H. H. Green, fellow of Sidney Sussex College and lecturer in anatomy in the university, for his M.D. thesis on monotreme teeth, a study in mammalian tooth development.

University of London

Mr. P. H. Mitchiner has been appointed by convocation, on the election of the graduates in medicine, to be their representative on the senate for the remainder of the period 1937–41, in place of Mr. W. G. Spencer, who has resigned.

The William Julius Mickle fellowship for 1938 has been awarded to Dr. Leonard Colebrook.

University of Birmingham

Three William Withering lectures on chemical transmission of the effects of nerve impulses will be delivered in the large theatre of the medical faculty buildings on Feb. 17th and 24th and March 3rd at 4 P.M. Sir Henry Dale, F.R.S., will give the first two lectures and Prof. F. R. Fraser the third. Members of the medical profession are invited to attend.

Royal College of Physicians of London

At a comitia of the college held on Jan. 27th, with Lord Dawson, the president, in the chair, the following were elected: Dr. A. S. Barnes on the court of governors of the University of Birmingham; Dr. J. A. Nixon on the court of the University of Bristol; Dr. H. A. Feiling on the council of the Queen's Institute for District Nursing. The following were appointed delegates: Dr. G. F. Buchan to the congress of the Royal Sanitary Institute at Portsmouth; Dr. A. Ramsbottom to the congress of the Royal Institute of Public Health at Blackpool; Prof. Roy Dobbin to the International Congress of Leprosy at Cairo; and Dr. J. D. Rolleston to the International Congress of the History of Medicine in Yugoslavia.

Dr. B. E. Schlesinger will deliver the Milroy lectures on the public health aspect of heart disease in childhood on Feb. 24th and March 1st; Dr. C. C. Ungley the Goulstonian lectures on some deficiencies of nutrition and their relation to disease on March 3rd, 8th, and 10th; Dr. George Riddoch the Lumleian lectures on pain of central origin on March 15th and 17th; and Dr. J. G. Greenfield the Oliver-Sharpey lectures on recent observations on the morphology of the neuron, and on the changes which it undergoes in disease, on March 22nd and 24th.

The following candidates having satisfied the censors' board were admitted members of the college:—

Allan William Abramson, M.B.Camb., Cecile Helen Denise Asher, M.D. Lond., Harry Baker, M.B. Manch., Richard Erskine Bonham-Carter, M.B. Camb., Edward Aloysius Joseph Byrne, M.D. Belf., John Houghton Colebatch, M.D. Melb., Seymour Donald Mayneord Court, M.B. Birm., Samuel Barnet Dimson, M.D. Lond., James Findlay Dow, M.B. Camb., William Robert Macfarlane Drew, M.B. Sydney, Capt. R.A.M.C., Tom Foulds, L.R.C.P. Lond., Thomas Bones Hamilton Haslett, M.D. Belf., James Holmes Hutchison, M.B. Glasg., Martin Cyril Gordon Israëls, M.D. Manch., Byron Arnold Ryland Disraeli Josef, L.M.S. Ceylon, L.R.C.P. Lond., Robert Bews Kerr, M.D. Toronto, Abdel Hamid Mustafa Kersha, M.B. Cairo, Hah Liong Lee, M.B. Hong Kong, Robert George Mallory Longridge, L.R.C.P. Lond., John Joseph McCann, M.B. Lond., Edward Rowland Alworth Merewether, M.D. Durh., Henry Francis Moore, M.D., D.Sc. Dubl., Noah Morris, M.D. Glasg., Alexander Jeremiah Orenstein, C.M.G., M.D. Jefferson Coll., L.R.C.P. Lond., Andrew Robertson, M.B. Edin., James Charles Shee, M.B. N.U.I., Horace Minton Shelley, F.R.F.P.S. Glasg., Reginald Norman Tattersall, M.B. Lond., Prem Nath Wahi, M.D. Lucknow, Hugh John Wallace, L.R.C.P. Lond., and Margaret Isabel Williams, M.B. Manch.

Licences to practise were conferred upon 159 candidates (146 men and 13 women) who have passed the final examination of the conjoint board and have complied with the by-laws of the college. The following are the names and medical schools of the successful candidates:—

Hugh Acton, Middlesex; C. L. Angell, Guy's; M. G. Baker, Sheff.; W. H. J. Baker, Lond.; R. E. Ball, Manch.; A. D. Barnett, Cardiff; H. C. Barry, Sydney and Lond.; C. F. Barwell, Camb. and St. George's; A. D. Bateman, St. Bart.'s; C. A. Bathfield and K. M. Bhansali, Univ. Coll.; D. L. Bennett, St. Bart.'s; J. R. Bignall, Camb. and Lond.; Joan M. Boissard, Cardiff; V. H. Bowles and W. E. W. Bridger, Guy's; B. A. M. Brown, Univ. Coll.; C. N. Brown, Guy's; Brian Brownscombe, Univ. Coll.; J. H. Bulleid, Brist.; Jacqueline V. Burch, Leeds; G. A. Burfield, Camb. and St. Thos.; P. E. G. Burnett, Middlesex; Bernard Burns, St. Bart.'s; Elizabeth M. Cadbury, Roy. Free; D. M. Carding, Camb. and St. Thos.; J. A. Chamberlin, St. Thos.; I. C. Chopra, Camb. and St. Bart.'s; Edward Clifford-Jones, Charing Cross; Samuel Cohen, Cardiff; Harris Cooper, Lond.; T. A. Cox, St. Mary's and West Lond.; R. V. Coxon and Anthony Crook, Guy's; Dorothy L. Crossly and Eveline M. Cumming, Roy. Free; S. S. Davidson, Guy's; E. B. Davies and D. R. Davis, Camb. and Middlesex; J. J. Davis, Guy's; Michael Dean, Univ. Coll.; John de Swiet, St. Mary's; J. H. Dobree, St. Bart.'s; A. S. Dods, Westminster; E. G. Dolton, St. Thos.; I. G. B. Drybrough-Smith, Guy's; Avis M. Dyer, Univ. Coll.; P. S. Edgecombe, Oxon. and St. Thos.; A. M. Edwards, Guy's; T. A. W. Edwards, Camb. and St. Bart.'s; P. G. Epps, Guy's; C. C. Evill, St. Bart.'s; A. C. Ferguson, Manch.; J. O. Fielding, Camb. and St. Thos.; Wilfred Fine and E. S. Foote, Guy's; A. B. Fountain, Charing Cross; J. E. Francis, Durh.; B. J. Frankenberg, Univ. Coll.; A. S. Garrett, King's Coll.; P. F. B. Gillett, Guy's; L. J. Grant, Lond.; S. I. Green, Guy's; P. R. B. Grimaldi, St. Thos.; Sydney Grossmark, St. Bart.'s; R. W. Gunderson, Middlesex; Max Halberstaedter, St. Bart.'s; J. W. Hallam, Guy's and Liverp.; R. N. Herson, St. Bart.'s; J. H. Hill, Cardiff; A. M. Hutton, Guy's; Stella M. Instone, Univ. Coll.; L. A. Ives, St. Bart.'s; Spencer Jackson, St. Thos.; E. L. James, Oxon. and King's Coll.; P. H. Jayes, St. Bart.'s; S. M. Jenner, St. Mary's; E. C. Jones, St. Bart.'s; J. M. Jones, King's Coll.; J. M. Jones, Univ. Coll.; R. C. Jones, Cardiff; B. A. R. D. Josef, Ceylon; Myer Kaufman, Cape and Lond.; J. W. L. Kemp, St. Bart.'s; W. M. Kirkby, St. Mary's; H. G. Langley, Lond.; R. W. Lass, Univ. Coll.; J. D. O. Lavertine, Middlesex; R. P. Lawson, St. Mary's; A. S. Lee, Guy's; J. B. Longmore, Oxon. and St. Bart.'s; Raphael Lyons, Liverp.; Ian Mackenzie, St. Thos.; F. T. Madge, Liverp.; O. T. Mansfield, Middlesex; K. A. Marandi, Birm.; Elizabeth C. Marshall, Mary O. Masters, and S. W. Maxwell, Univ. Coll.; Otto Meerapfel, Guy's; A. D. Messent, St. Bart.'s; D. H. R. Montgomery, St. Thos.; W. E. D. Moore, Camb. and St. Thos.; D. N. B. Morgan, Middlesex; J. N. Morrison, Lond.; D. V. Morse, St. Bart.'s; B. B. Nehaul, Univ. Coll.; R. G. W. Ollerenshaw, Oxon. and Manch.; P. J. O'Meara, Birm.; Thomas Parkinson, St. Bart.'s; J. N. M. Parry, Cardiff; Cyril Phillips, Guy's; A. B. Pollard, St. Mary's; K. W. Powell, St. Thos.; D. W. Pugh, Lond.; M. W. Radzan, King's Coll.; Louis Ray, Lond.; M. T. Read, Middlesex; Ranyl Rhydwen, Guy's; K. S. Richard and H. J. Richards, Univ. Coll.; D. A. Richmond, Manch.; J. W. Richmond, King's Coll.; A. T. M. Roberts, Guy's; C. A. Roberts, Camb. and Manch.; Mary A. Rogerson, Manch.; Elly Rosenberg, Guy's and St. Bart.'s; R. W. N. L. Ross, St. Mary's; T. R. Savage, Oxon. and Lond.; T. T. Schofield, Middlesex; J. W. Shannon, Lond.; N. P. Shields, Camb. and St. Bart.'s; G. L. B. A. Silva, Ceylon and Middlesex; G. H. A. Simmons, St. Bart.'s; J. R. Sinton, Westminster; F. M. Smith and H. D. Smith, Guy's; Kenelm Smith, Lond.; H. W. Starkey, Sheff.; D. C. Sturdy, Camb. and St. Bart.'s; A. W. Taylor, Guy's; K. H. Taylor and R. L. Thompson, St. Thos.; A. H. Thomson, St. Bart.'s; K. B. Thornton, St. Thos.; A. G. G. Toomey, Middlesex; Ivy M. Tuck, Audrey V. Turner, and W. M. L. Turner, Univ. Coll.; Nicholas Vere-Hodge, Camb. and St. George's; H. P. Watts, Westminster; J. M. Wedderspoon, Camb. and St. Bart.'s; H. F. Whalley, Leeds; T. E. Whitby, Liverp.; D. J. Wigginton, Guy's; E. D. Williams, Cardiff; A. R. Wood, St. Thos.; Jean R. Young, Roy. Free and West Lond.; and W. B. Young, Oxon. and St. Thos.

Diplomas were granted, jointly with the Royal College of Surgeons, to the following candidates:—

Diploma in Public Health.—W. L. H. L. Bell, V. D. Blackburn, R. R. Clipstein, P. N. Gokhale, John Landon, Caroline A. Meade, Gladys M. G. Spencer, Agnes B. Sutherland, Christina J. Thomson, Patricia S. Warren, J. O. Williams, and V. F. F. Winslow.

Diploma in Tropical Medicine and Hygiene.—Hargobind Prasad, B. M. Rao, A. C. Seneviratne, and D. H. Waldron.

Diplomas in psychological medicine and in laryngology and otology were also granted to those candidates mentioned on Jan. 22nd in the report of the meeting of the Royal College of Surgeons and in anæsthetics to those mentioned on Dec. 18th and Jan. 22nd.

Royal College of Surgeons of England

Mr. P. B. Ascroft's Hunterian lecture, which was to have been given on Feb. 11th, has been postponed.

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Society of Apothecaries of London

At recent examinations the following candidates were successful :—

Surgery.—N. D. Cousins, Univ. of Manch. and West Lond. Hosp.; T. C. Hallinan, Univ. of Camb. and Charing Cross Hosp; B. M. Hulse, Welsh National School of Medicine; and C. K. Westropp, Univ. of Oxford and King's Coll. Hosp.

Medicine.—P. H. Beamish, St. George's Hosp; A. W. Frankland, St. Mary's Hosp; D. H. Fowler, Middlesex Hosp.; T. C. Hallinan, Univ. of Camb. and Charing Cross Hosp.; B. T. Jones, St. Mary's and West Lond. Hosps.; G. E. King-Turner, Guy's Hosp.; and C. K. Westropp, Univ. of Oxford and King's Coll. Hosp.

Forensic Medicine.—P. H. Beamish, St. George's Hosp.; A. W. Frankland, St. Mary's Hosp.; D. H. Fowler, Middlesex Hosp.; T. C. Hallinan, Univ. of Camb. and Charing Cross Hosp.; and C. K. Westropp, Univ. of Oxford and King's Coll. Hosp.

Midwifery.—A. N. Boyle, Univ. of Manch.; G. H. L. Bullmore, Univ. Coll. Hosp.; A. W. Frankland, St. Mary's Hosp.; A. J. Patenall, Guy's Hosp.; M. Tombuk, Univ. of Liverp.; T. G. Viljoen, Guy's Hosp.; and C. K. Westropp, Univ. of Oxford and King's Coll. Hosp.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery: D. H Fowler, B. T. Jones, and C. K. Westropp.

British College of Obstetricians and Gynæcologists

The quarterly meeting of the council of the college was held on Jan. 29th, with Sir Ewen Maclean, the president, in the chair. Grace Stapleton (New Delhi) was admitted to the fellowship, and Allan Frederick Hollinrake (Hamilton, Canada) to the membership. The following were also elected to the membership :—

Yeshwant Narayen Ajinkya, India; John James Armitage, Salisbury; Elinor Francis Elizabeth Black, Canada; Doris Barbara Brown, Harrogate; William Deans Brown, London; William Davies Cunningham, Australia; Mary Evans, Martin Birks Hallam, and Ockert Stephanus Heyns, Manchester; Fergus Duncan Johnston, Canada; John Cameron Loxton, Australia; Benjamin Edward Meek, Canada; John Miller, Greenock; Edward Brettingham Moore, Tasmania; Susanne Jean Paterson, Edinburgh; Robert William Nichol, London; Charles Guy Roworth, Aberdeen; Linton Morris Snaith, Manchester; David Fox Standing, South Africa; Dorothy Marian Stewart, London; Robert Atkinson Tennent, Glasgow; Geoffrey Ashburton Thompson, Australia; William Howie Tod, Leeds; Clifford Vincent Ward, John Clinton Whyte, and Alice Woodhead, Canada.

The president was appointed representative of the college on the Royal Commission on the Geographical Distribution of the Industrial Population, and Mr. J. Bright Banister on the Council of the Queen's Institute of District Nursing.

British Postgraduate Medical School

In the department of medicine Mr. Kenneth Walker will give six lectures on venereal diseases (March 3rd, 10th, 17th, 24th, 31st, and April 7th, at 4.30 P.M.). In the department of surgery Mr. L. R. Broster will lecture on the surgical application of endocrinology with special reference to the adrenal glands (Feb. 24th, March 3rd, and 10th, at 2.30 P.M.), and Mr. Geoffrey Keynes on diseases of the breast (March 11th, 18th, 25th, April 1st, and 8th, at 2.30 P.M.). In the department of pathology Dr. Dorothy Russell will speak on tumours of the central nervous system and meninges (Feb. 23rd, March 2nd, and 9th, at 4.30 P.M.), and Prof. C. R. Harington, F.R.S., on the thyroid and its secretions (March 16th, 23rd, and 30th, at 4.30 P.M.). Dr. Janet Vaughan will conduct a laboratory course on hæmatology beginning on Feb. 21st, and Mr. Earl King, Ph.D., a laboratory course on chemical pathology beginning on April 18th. In the department of obstetrics and gynæcology a course of thirteen lectures on present-day gynæcology will be held on Thursday afternoons at 3.30 P.M. beginning on March 3rd. The lecturers are as follows: Mr. A. S. Parkes, Sc.D., F.R.S. (the female sex hormones), Mr. Malcolm Donaldson (dysmenorrhœa), Mr. V. B. Green-Armytage (sterility), Mr. Wilfred Shaw (irregular uterine hæmorrhage, and neoplasms of the ovary), Dr. T. N. MacGregor (hormone therapy in gynæcology), Prof. W. Fletcher Shaw (genital prolapse), Mr. L. Carnac Rivett (benign neoplasms of the uterus), Miss Louisa Martindale (radiation therapy in gynæcology), Colonel L. W. Harrison (gonorrhœa in women), Mr. Aleck Bourne (salpingitis), Dr. Helena Wright (birth control). Further information may be had from the dean of the school, Ducane-road, W.12.

University of Manchester

Applications for a Sir Henry Royce fellowship for research on the common cold or on influenza are invited in our advertisement columns. It will be of the value of £500 per annum and tenable for three years.

British Association of Radiologists

On Friday, Feb. 18th, at 4 P.M., Sir Walter Langdon-Brown will deliver the second Skinner lecture to this association at 32, Welbeck-street, London, W. His subject will be the Pursuit of Shadows, and all members of the medical profession are invited to attend.

Pharmaceutical Society of Great Britain

A meeting of this society will be held at 17, Bloomsbury-square, London, W.C., on Tuesday, Feb. 8th, at 8.30 P.M., when Dr. R. B. Wasicky, professor of pharmacognosy in the pharmaceutical institute of the University of Vienna, will speak on modern points of view and methods in pharmacognosy. During the evening the Hanbury medal, which was awarded to him last year, will be presented to Prof. Wasicky.

Lady Tata Memorial Trust

The trustees of this fund invite applications for grants and scholarships for research in diseases of the blood, with special reference to leukæmia.

Grants of variable amount are made for research expenses or to provide scientific assistants to senior workers. Scholarships are awarded as personal remuneration; their value will not ordinarily exceed £400 per annum for whole-time research, with proportionate adjustment for work on a part-time basis where this is approved. The grants and scholarships are open to workers of any nationality. Applications must be submitted before March 31st, and the awards will be made by the trustees in June for the academic year beginning on Oct. 1st. Further particulars and forms of application may be had from the secretary of the scientific advisory committee, 138, Bedford Court Mansions, London, W.C.1.

Vacancies

For further information refer to the advertisement columns

Aberdeen University.—Lecturer in Bacteriology, £500–£600.
Birmingham, Selly Oak Hosp.—Jun. M.O., at rate of £200.
Birmingham United Hosp.—Asst. Surgeon, £50.
Blackburn County Borough.—Asst. M.O.H., £600. Also Asst. M.O.H. and Asst. School M.O., £600.
Bolton Royal Infirmary.—H.S., £150.
Bradford Royal Infirmary.—H.S., at rate of £150.
Bristol City and County.—Asst. M.O.H., £500.
Cambridge, Addenbrooke's Hosp.—H.S., at rate of £130.
Cambridgeshire County Council.—Deputy M.O.H., £600.
Chesterfield and North Derbyshire Royal Hosp.—Cas. O. and Fracture H.S., at rate of £200.
Chichester, West Sussex County Mental Hosp.—Med. Supt., £1100.
Derbyshire Royal Infirmary.—Three H.S.'s for Special Depts., each £150.
Dewsbury and District General Infirmary.—Sen. and Second H.S., at rate of £200 and £150 respectively.
Ealing Borough.—Asst. M.O.H., £600. Also Res. Asst. M.O., £350.
Eastbourne, Royal Eye Hosp.—H.S., £100.
East Ham Memorial Hosp., Shrewsbury-road, E.—H.P., at rate of £150.
Fulham Metropolitan Borough Maternity Home and Clinic.—Res. M.O., &c., £350.
Gloucestershire County Council.—Deputy County M.O.H., £750. Also Asst. County M.O.H., £500.
Gloucestershire Royal Infirmary, &c.—H.S. to Ear, Nose, and Throat Dept., at rate of £150.
Grenfell Association, 66, Victoria-street, S.W.—Doctor, for Grenfell Mission Hosp.
Hellingly, East Sussex County Mental Hosp.—Jun. Asst. Res. M.O., £350.
Hosp. for Sick Children, Great Ormond-street, W.C.—Res. Aural Reg., £150.
Huddersfield, Bradley Wood Sanatorium.—Res. M.O. and Asst. M.O.H., £600.
Huddersfield Royal Infirmary.—Cas. O., at rate of £200.
Hull Royal Infirmary.—Second Cas. O., at rate of £150.
Iraq Government.—Obstetrician and Gynæcologist, 150 Dinars per mensem. Also Ear, Nose, and Throat Specialist and General Surgical Specialist, each 120 Dinars per mensem.
Kettering and District General Hosp.—Cons. Physician. Also H.P., at rate of £150.
Leamington Spa, Warneford General Hosp.—Res. Cas. O. and H.S., at rate of £150.
Leeds City.—Asst. M.O., £500.
Liverpool University.—Two Demonstratorships in Physiology, each £300.
Lochgilphead, Argyll and Bute District Mental Hosp.—Res. Asst. M.O., £300.
London County Council.—P.H. Dept.: Asst. M.O., £750. Asst. M.O.'s, Grade I and Grade II, £350 and £250 respectively. Also Temp. Visiting M.O., at rate of £150.

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London University.—University Readership in Embryology, £750.
Manchester, Ancoats Hosp.—Cas. O., £150. Also H.S. to Ear, Nose, and Throat Dept. and H.P. to one of the Hon. Physicians, each at rate of £100.
Manchester, Christie Hosp. and Holt Radium Institute, Withington.—Res. M.O., at rate of £150.
Manchester, Duchess of York Hosp. for Babies.—Sen. and Jun. Res. M.O.'s, at rate of £125 and £75 respectively.
Manchester Royal Eye Hosp.—Jun. H.S., £120.
Manchester University.—Sir Henry Royce Fellowship, £500.
Marie Curie Hosp., 2, Fitzjohn's-avenue, N.W.—Res. M.O., £100.
Metropolitan Hosp., Kingsland-road, E.—Cas. O. and Res. Anæsthetist, £100.
Miller General Hosp., Greenwich-road, S.E.—Cas. O., at rate of £150. Also H.P. and H.S., each at rate of £100.
Newcastle-upon-Tyne Education Committee.—Asst. School M.O., £500.
Nottingham Children's Hosp.—Res. H.P. and Res. H.S., each at rate of £150.
Portsmouth Royal Hosp.—H.S. to Orthopædic and Fracture Dept., at rate of £130.
Preston, Wrightington Hosp., Appley Bridge.—Jun. Asst. M.O., at rate of £300.
Prince of Wales's General Hosp., N.—Hon. Med. Reg., £100. Also Jun. H.P. and two Jun. H.S.'s, each at rate of £90.
Queen Mary's Hosp. for the East End, E.—Hon. Asst. Obstet. and Gynæcological Surgeon.
Royal Naval Medical Service.—M.O.'s.
Royal Waterloo Hosp. for Children, &c., Waterloo-road, S.E.—Anæsthetist, £52.
Runcorn, Cheshire, Evans Biological Institute.—Sen. Bacteriologist.
St. Bartholomew's Hosp., E.C.—Chief Asst. in X Ray Diagnostic Dept., £400–£500.
St. John's Hosp., Lewisham, S.E.—Phys. and Cas. O., at rate of £100. Also Med. Reg., 50 guineas.
Scotland, Department of Health.—Two Regional M.O.'s, each £800. Also two M.O.'s, each £750.
Southampton Children's Hosp. &c.—Res. M.O., at rate of £150.
Southend Municipal Hosp.—Asst. M.O., £325.
South London Hosp. for Women, Clapham Common, S.W.—Clin. Assts.
Surrey County Council.—Asst. M.O., £600.
Sutton and Cheam Hosp.—Jun. Res. M.O., at rate of £100.
West End Hosp. for Nervous Diseases, 73, Welbeck-street, W.—Hon. Psychotherapist.
West London Hosp., Hammersmith-road, W.—Med. Reg., £100. Also Res. Anæsthetist, at rate of £100.
Willesden General Hosp., Harlesden-road, N.W.—Gynæcological Registrar.
Wolverhampton, New Cross Hosp.—Res. Asst. M.O., £200.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Rugeley (Staffordshire) and Cromarty (Ross and Cromarty).

Medical Diary

February 7th to February 12th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY.

Therapeutics and Pharmacology. 5 P.M., Mr. R. K. Callow, D.Phil.: The Significance of the Excretion of Sex Hormones in the Urine.

Psychiatry. 8.30 P.M., Dr. G. W. B. James, Dr. Rudolph Freudenberg, and Dr. A. Tandy Cannon: A Year's Experience of Insulin Therapy.

WEDNESDAY.

Surgery: Subsection of Proctology. 5 P.M., Sir Charles Gordon-Watson and Sir Harold Gillies: Plastic Operation for Traumatic Anal Atresia. Specimens will be shown by Sir C. Gordon-Watson, Prof. G. Grey Turner, Mr. W. B. Gabriel, and Dr. Cuthbert Dukes.

FRIDAY.

Ophthalmology. 5 P.M., Clinical meeting at the Birmingham and Midland Eye Hospital.

Clinical. 5.30 P.M. (Cases at 4.30 P.M.). Mr. Duncan Fitzwilliams: (1) Hindquarter Amputation for Sarcoma; (2) Extensive Squamous Carcinoma of Tongue; (3) Carcinoma of Tongue Secondary to a Primary Growth in the Bronchus; (4) Secondary Metastases following Carcinoma of the Breast. Dr. F. Parkes Weber and Dr. Janet Aitken: (5) Subcutaneous Movable Spherules in the Ehlers-Danlos Syndrome. Dr. Parkes Weber: (6) A Member of an Acholuric Jaundice Family Described in 1910. Dr. Ernest Fletcher: (7) Arthritis of Lumbar Vertebral Articulation; (8) Spondylitis Ankylopoietica with Infective Focus in the Sacro-iliac Joints.

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY.
THURSDAY.—8.30 P.M. (11, Chandos-street, W.), Sir Walter Langdon-Brown: The Contribution of Adler to General Medicine.

SOUTH-WEST LONDON MEDICAL SOCIETY.
WEDNESDAY.—9 P.M., Dr. A. W. Spence: Some Aspects of Modern Endocrine Therapy.

PADDINGTON MEDICAL SOCIETY.
TUESDAY.—9 P.M. (St. Mary's Hospital, W.), Mr. F. A. Juler and Mr. F. A. Williamson-Noble: Demonstrations of ophthalmic cases; application of contact lenses; and methods of squint training.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.
FRIDAY.—8.45 P.M. (Miller General Hospital, Greenwich, S.E.), Dr. H. M. Joseph: Monocular Conjunctivitis.

BIOCHEMICAL SOCIETY.
SATURDAY.—4.30 P.M. (Wellcome Chemical Research Laboratories, Euston-road, N.W.), short communications.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.
MONDAY.—5 P.M., Mr. H. J. B. Atkins: Chronic Mastitis.
WEDNESDAY.—5 P.M., Mr. T. Stewart Heslop: An Experimental Study of the Neurogenic Origin of Peptic Ulceration. (Hunterian lectures.)

UNIVERSITY OF BIRMINGHAM.
THURSDAY.—4 P.M. (Medical Lecture Theatre), Dr. Leonard Colebrook: Control of Puerperal and Other Infections caused by Hæmolytic Streptococci. (Second Ingleby lecture.)

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland-place, W.
WEDNESDAY.—Dr. Vynne Borland: Public Health Aspects of Personal Hygiene.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
TUESDAY.—4.30 P.M., Prof. Arthur Ellis: Nephritis.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Dr. T. C. Stamp: The Bacteriology of Acute Respiratory Infections (2). 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Dr. J. G. Greenfield: Neuropathology.
THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration. 3.30 P.M., Dr. A. A. Moncrieff: General Hygiene and Emergencies, Jaundice, Hæmorrhage, Respiratory Failure.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Prof. Lambert Rogers: Surgery of the Spinal Cord and Peripheral Nerves.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY.—4.15 P.M., Mr. Arnold Walker: Puerperal Pyrexia.
TUESDAY.—4.15 P.M., Mr. Wood Walker: Hernia.
WEDNESDAY.—4.15 P.M., Dr. Redvers Ironside: Wasted Hands (neurological demonstration).
Clinics, ward visits, and operations daily at 10 A.M. and 2 P.M.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
TUESDAY.—5 P.M., Dr. Thompson Barron: Common Skin Diseases in Childhood.
WEDNESDAY.—5 P.M., Dr. I. Muende: Histopathology of Some Common Skin Diseases.
THURSDAY.—5 P.M., Dr. J. L. Franklin: Bullous Eruptions. (Chesterfield lectures.)

ST. GEORGE'S HOSPITAL, S.W.
THURSDAY.—5 P.M., Dr. Mildred Creak: Psychiatric Demonstration.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY.—2 P.M., Sir 'Lancelot Barrington-Ward: Intussusception. 3 P.M., Dr. G. H. Newns: Scurvy.
Out-patient clinics daily at 10 A.M., and ward visits at 2 P.M.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY.—3.30 P.M., Dr. D. E. Denny-Brown: Polyneuritis.
TUESDAY.—3.30 P.M., Dr. J. P. Martin: Neurosyphilis (2).
WEDNESDAY.—3.30 P.M., Dr. F. M. R. Walshe: Clinical demonstration.
THURSDAY.—3.30 P.M., Dr. C. Hinds Howell: Subacute Combined Degeneration of the Cord.
FRIDAY.—3.30 P.M., Dr. D. E. Denny-Brown: Polyneuritis.
Out-patient clinic daily at 2 P.M.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL.
WEDNESDAY.—4 P.M., Mr. W. H. Ogilvie: The Changing Ground of Surgery.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
MONDAY to FRIDAY.—4.30 P.M., course in methods of examination and diagnosis.
FRIDAY.—4 P.M., Mr. F. W. Watkyn-Thomas: Vertigo.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY to SATURDAY.—CHELSEA HOSPITAL FOR WOMEN, Arthur-street, S.W., all-day course in gynæcology. F.R.C.S. (PRIMARY) COURSE IN PHYSIOLOGY: Mon., Wed., and Fri., 5.30 P.M.—ST. JOHN'S HOSPITAL, 5, Lisle-street, Leicester-square, W.C., afternoon course in dermatology. Debate at 1, Wimpole-street, W., Wed., 8.30 P.M., Sir Beckwith Whitehouse and Dr. W. H. F. Oxley: That the Law on Abortion Requires Reform.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.
FRIDAY.—4.30 P.M., Dr. J. L. Livingstone: Physical Medicine in Diseases of the Respiratory System. (Asthma.)

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION.
WEDNESDAY.—4 P.M. (St. James' Hospital, Ouseley-road, S.W.), Dr. C. E. Lakin: Demonstration of medical cases.

LEEDS GENERAL INFIRMARY.
TUESDAY.—3.30 P.M., Dr. William MacAdam: Some Recent Advances in Endocrinology.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY.—4.15 P.M. (Royal Mental Hospital, Gartnavel), Dr. Angus MacNiven: The Early Symptoms of the Psychoses.

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NOTES, COMMENTS, AND ABSTRACTS

CHILDREN'S ALLOWANCES DURING UNEMPLOYMENT

THE Children's Minimum Council, whose aim is "to ensure that no child shall, by reason of the poverty of its parents, be deprived of at least the minimum of food and other requirements necessary for full health," has submitted a statement to the Unemployment Insurance Statutory Committee urging that part of any surplus available for distribution by the committee should be used to increase the allowances for dependent children.

For employed workers the rise in the cost of living has been partly offset by higher wages, but the unemployed have had to meet rising prices on a stationary income, and the families with young children have suffered the most. Table I, compiled by the Council, shows "standards of primary needs," while Table II shows the gap between standard benefit and the expenditure regarded as necessary for health, widening with each additional child in the family.

TABLE I.—STANDARDS OF PRIMARY NEEDS

	B.M.A.	Merseyside survey.			U.A.B. scale.	Total.
	Food.	Clothing, cleaning, and light.	Fuel.		Rent.	
	s. d.	s. d.	s. d.		s. d.	s. d.
Family A: Man and wife ..	13 9½	3 1	2 8		6 0	25 6½
Family B: Man, wife, and child (2–3 yrs.)..	16 11	4 3	2 8		7 0	30 10
Family C: Man, wife, and three children (1–2, 6–8, 8–10 yrs.)	25 5½	6 7	2 8		8 7½	43 4
Family D: Man, wife, and five children (1–2, 4–5, 6–8, 11, and 12–14 yrs.) ..	36 11½	8 11	2 8		10 7½	59 2

B.M.A. = Scale proposed by British Medical Association's committee on nutrition. U.A.B. = Unemployment Assistance Board.

TABLE II.—THE GAP

—	Standard of primary needs.	U.A.B. scale.	Standard benefit.	Amount by which unemployment pay exceeds or falls short of minimum needs.	
				U.A.B.	Standard benefit.
	s. d.	s. d.	s. d.	s. d.	s. d.
Family A ..	25 6½	26 0	26 0	+ 0 5½	+ 0 5½
Family B ..	30 10	29 0	29 0	− 1 10	− 1 10
Family C ..	43 4	35 0	35 0	− 8 4	− 8 4
Family D ..	59 2	42 6	41 0	−16 8	−18 2

Table I estimates the cost of primary needs (at December, 1937, prices) on the basis, for *food* of the B.M.A. minimum diets, for *clothing, cleaning, light and fuel* of the Merseyside Survey poverty line, and for *rent* of the basic rent provided for in the scale allowances under Unemployment Assistance. The B.M.A. report makes a reduction of about 5 per cent. on the sum of individual diets in the case of the larger families, and this practice has been followed for Family D. For the other families, the specimen diets given in the report have been used. It should be noted that if the recommendations of the Ministry of Health and League of Nations nutrition committees were followed with regard to milk, the food expenditure for families would be appreciably higher. The rent assumed is low, especially for London; and while U.A.B. allowances are adjusted according to the actual rent, unemployment benefit is not.

The estimates of primary needs, the Council point out, allow not a penny beyond the bare necessities of living; nothing for those "conventional needs"—fares, burial clubs, household and personal sundries—on which even the poorest and thriftiest of families must spend something. "We are aware that men on statutory benefit may have other resources, but where there are young children it is very unlikely that savings can be made out of wages."

According to Table II the amounts by which families on standard benefit fall below this needs level increase from 1*s.* 10*d.* in Family B, where there is one child, to a discrepancy of 18*s.* 2*d.* in Family D, with five children. After rent has been paid and the provision for clothing, cleaning, fuel, and lighting laid down in the Merseyside Survey made, the amount remaining for food, in Families C and D, works out at 3*s.* 6½*d.* and 3*s.* 2*d.* per head.

The memorandum concludes as follows:—

"We recognise that the statutory committee must approach its problem primarily from the actuarial standpoint; but if the question of need were quite irrelevant, there would be no children's allowances at all.

"We plead now for an increase, because we believe that the money required could not be distributed in any way which would give a greater return in human welfare and happiness. We estimate that the addition of 1*s.* to the children's allowances which would increase the income of a family with four children from 38*s.* to 42*s.* would cost no more than an all-round increase in benefit of 7*d.* a week for each insured person. In 1935, the cost of an additional 1*s.* for each child was estimated at £1,250,000 a year. The fall in unemployment since that date probably means that a much smaller sum would be required at the present time.

"Families without resources where there are five or more children have always been better off under the Unemployment Assistance Board than on standard benefit. This discrepancy in favour of the U.A.B. families has been extended since the circular which authorised the Board's officers to grant additional allowances to households in view of the increased cost of living. In cases where unemployment benefit falls so far below the needs of families as to inflict obvious and serious hardship, the unemployed on standard benefit can no longer obtain relief from the public assistance authorities. They can, however, apply for supplementary assistance to the Board. It seems necessary to make three comments on this position.

(*a*) If the income going to the larger families where the chief wage-earner is on standard benefit is to be brought up to a level adequate to maintain health, or even to equal the amounts given under the U.A.B., a very large number of families still within the insurance scheme will have to apply to the Board for this supplementary assistance. But the report of your committee on insurance in agriculture recognised the undesirability of establishing rates of benefit

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so low that such a consequence is likely to follow. If families in insurance have to obtain supplementary relief from the Board, duplication and waste in the service and vexation and confusion to applicants will result from their being dealt with by two separate bodies.

(*b*) If, on the other hand, the present scale of benefit is *not* supplemented by the Board, it means that many children in unemployed families will be submitted to a period of poverty and malnutrition which is likely to inflict on them permanent damage.

(*c*) The only way out of this apparent deadlock is an increase in the allowances for child dependents. Even if these allowances are raised by 1*s*. per child, a family such as Family D in Table B, with five children, will still be in receipt of an income which falls short of minimum needs by 13*s*. 2*d*.

"We are therefore asking . . . for an increase in children's allowances of at least one shilling for each child."

BIOLOGY OF WATER-SUPPLY

THE interesting exhibit illustrating the biology of water-supply that is shown in the central hall of the Natural History Museum has already been noticed in THE LANCET. The trustees have now followed the precedent of a previous occasion when Mr. Kirkpatrick described a similar exhibit. The new pamphlet is by Anna B. Hastings, assistant keeper in the department of zoology of the Museum, and is largely based on the earlier one. As the author states in the introduction, "The procedure in modern waterworks is based on a wealth of knowledge in many branches of science (engineering, bacteriology, biology, &c.) and makes possible the supply of water of a purity that would have surprised our ancestors." Bacteria, green algæ, and infusoria all play an important part in the purification of raw river or lake water. Infusoria probably do much to simplify proteinous substances by excreting amines and other bodies that yield ammonia to be oxidised by nitrifying bacteria, while the green algæ, as was shown in the recent report on the Tees,[1] furnish the oxygen, additional to that dissolved from the air, which enables nitrification to go on. Large amounts of any of these, however, in water that is freely exposed to air and sunshine and contains enough silica, phosphorus, and nitrogen, may lead to such inordinate growth of one or other group that the water becomes green and unpleasant-looking or may develop a flavour which, even if harmless, is not acceptable to consumers, who are not backward in complaining to the water authority. Colonel C. H. H. Harold's last report to the Metropolitan Water Board, as well as many of those of his predecessors, shows how often this may occur, more especially in the summer months when sunlight and high temperatures favour rapid growth. Larger organisms, such as sponges, snails, the duck mussel and the zebra mussel, may find their way into exposed water on the feet of birds and in other ways, while the encysted forms of many small organisms are airborne. The eggs of midges may be laid at the edges of reservoirs and develop into "red worms," which, although they live for the most part in mud, come to the surface to breathe and so may be found in water at all depths. If this is not filtered before going into the pipe system the bodies of all these may be found in the consumers' mains, while some—e.g., mussels—may live and grow into groups that materially reduce the rate of flow in the pipes, and when dead make water very unpleasant.

The pamphlet describes the more important forms of life that affect water-supplies, giving very good illustrations, both drawings and photographs, of typical examples, which should aid in identification. Means of controlling the more troublesome animals and plants are indicated. Among the interesting groups of microscopical objects diatoms are prominent, both as supplying oxygen for formation of nitrates and as contributing unpleasant tastes to water. It may be noted that Colonel Harold, whose aid in the preparation of both pamphlet and exhibit is cordially acknowledged, has added to the chemical examination of London water the determination of silica, which as the material of the diatoms' elegant valves limits their development in water.

The pamphlet, which costs only 1*s*., should be interesting and useful to all concerned with water-supply.

[1] See *Lancet*, Jan. 29th, p. 288.

AMBIGUITIES IN HOOKWORM INVESTIGATIONS

THOUGH 1937 has added to confusion in parts of the hookworm problem, it has also suggested ways of simplification.

For example Pessôa and Pascale[1] gave each of 8 persons two treatments of tetrachlorethylene in gelatin capsules and in an adult dose of 4 c.cm.; they counted the worms which came away after such treatment; they ascertained that the fæces of these persons were free from hookworm eggs when tested after their second treatments by Willis's gravity floatation treatment; and they concluded that they had unwormed them. Their first treatments brought away 95·8 per cent. of the total worm collection. On the other hand Maplestone and Mukerji[2] gave to each of 90 persons 4 c.cm. of tetrachlorethylene shaken up in a saturated solution of sodium sulphate, and, using direct centrifugal floatation (D.C.F.) to determine unworming, they got a cure-rate of 55 per cent. after one such treatment and of 70 per cent. after two. They put it that the essential basis for settling any drug's anthelminthic value must not be egg-counts but unworming, and to determine this one must use the most exact diagnostic method available to show whether eggs are or are not still being passed. They presumably had in mind the consideration that a poor diagnostic technique used after treatment will not find eggs which are present and will give a high and false value to the drug used. Their choice of direct centrifugal floatation for this purpose is the more significant in that it was Maplestone who suggested to Willis the use of the gravity floatation method which commonly bears the latter's name.

Yet the different figures may be due to more than different diagnostic methods and computations, for the Brazilian and the Calcutta series have one, perhaps two other differences. There is no knowledge that the necators and ancylostomes were present in the cases in the same proportions, and the drug was given in gelatin capsules in one test and measured and shaken up in fluid in the other. The latter difference has this importance that (as Maplestone and Mukerji show) tetrachlorethylene evaporates through these capsules so that their use does not ensure giving the desired dose; and these investigators go on to suggest that their earlier experience of an unworming-rate of 14·3 per cent. in 28 adults, after presumed doses of 3 c.cm. of the drug given alone and in capsules, was due to unsuspected evaporation before they gave it. Yet even the later Calcutta figures covered an unsatisfyingly small number of treatments.

Extensive work by Allen Scott[3] in Egypt suggests means of straightening out some of this tangle and of simplifying the practical problem. On 253 fæcal specimens selected at random he had examinations made in his laboratory by the Stoll-Hausheer method (which by adequate dilution in decinormal caustic soda solution scatters and makes visible all insoluble fæcal constituents), and there were courteously supplied to him the corresponding figures which had been got from the same fæcal specimens in one

[1] Pessôa, S. B., and Pascale, H., *Ann. paulist. Med. Cirurg.* 1937, **34**, 429.
[2] Maplestone, P. A., and Mukerji, A. K., *Indian med. Gaz.* 1937, **72**, 650.
[3] Scott, J. A., *Amer. J. Hyg.* 1937, **26**, 455.

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of the Government endemic diseases hospitals, which used a floatation technique presumably intended to concentrate hookworm eggs after they had been freed from ordinary fæcal matter. The examinations were quite independent. When the dilution technique used 0·005 g. of fæces it showed 89 positives and when it used 0·015 g. the number was 109; the floatation technique showed 76. Scott further found that in a series of fæcal specimens the Willis technique always showed more positives than the dilution one. It appears then that these Egyptian government institutions are missing numbers of infections by reason of the technique they are using.

Scott's experience reinforces two views already put forward. Egg-counts do not measure worm numbers, a point on which Maplestone and Mukerji are equally satisfied and on which the post-mortem work of Gunawardana [4] in Ceylon will by most be taken as making a final settlement. Secondly, it has been found once again that the more infected persons a community has, the greater is the mean worm-load of each infected person; and, as Scott notes, the fact of this constant relationship between the prevalence and intensity of infection throughout Egypt has important implications in any study of its epidemiology. An obvious one is that both there and elsewhere public health authorities have no need to undertake these tedious and costly egg-counts in order to get a working knowledge of the situation; they can find out where individual infections average the highest merely by determining the general prevalence of the infection, and in doing so they will be well advised to use a technique which combines accuracy with rapidity and so with cheapness.

The facts that 1937 has added to knowledge point once more to D.C.F. as the most accurate diagnostic method, and Clayton Lane [5] conservatively estimated six years ago, that, apart from the collecting staff, necessarily a part of every scheme dealing with this infection, four microscopists fed by a 12-tube D.C.F. centrifuge can make 250,000 fæcal examinations yearly. By this means one may determine accurately and rapidly the presence in individuals of even a single normally ovipositing hookworm, the number of persons infected in a selected area, and, by inference, the weight of infection there. But, if so desired, this method, without making egg-counts, will give yet more information on the weight of individual infections by an arbitrary estimate of the size of the herd of hookworm eggs which it collects—a grading by density which Lane thought likely to prove no less satisfactory in this case than it does in the Wassermann reaction.

Conflicting statements about the efficiency of anthelminthic drugs and the degree of hookworm infection in particular areas are largely the result of lack of precision in diagnosis. This vagueness is no longer justified and would not persist were these matters taken up for settlement with proper care and on a sufficient scale.

[4] Gunawardana, S. A., *Ceylon J. Sci.* (Sect. D, Med. Sci.), 1937, 4, 153.
[5] Lane, C., Hookworm Infection, London, 1932, p. 276.

Appointments

ALBURY, MICHAEL, M.B. Camb., Hon. Medical Officer in Charge of Infant Consultations and Children's Department at the St. Marylebone Western General Dispensary.
BENNET, MURIEL L., M.B. Manch., Resident House Surgeon at the Royal Manchester Children's Hospital, Pendlebury.
EVANS, A. MAXWELL, M.D., D.M.R.E., Assistant Radiologist at Addenbrooke's Hospital, Cambridge.
HARVEY, FLORENCE E. M., M.B. Sheff., Assistant Medical Officer (Maternity and Child Welfare) for Hammersmith.
LAUSTE, L. W., M.D. Lond., F.R.C.S. Eng., Resident Medical Officer at the Royal Cancer Hospital (Free) London.
PATERSON, J. M., M.B. Aberd., D.P.H., Assistant Medical Officer and School Medical Officer for Morley.
PEACOCK, ROYDON, B.Chir. Camb., F.R.C.S. Eng., Second Consulting Laryngologist to the King Edward Memorial Hospital, Ealing.
PETRIE, JOHN, M.B. St. And., D.P.H., Medical Officer of Health for Uckfield Rural District.
PHILPS, A. S., F.R.C.S. Eng., Ophthalmic Surgeon to the Victoria Hospital for Children, Chelsea.
PIERCE, W. J., M.B. Liverp., D.P.H., Senior Assistant School Medical Officer for Northumberland.
SKLARZ, PRUST, M.D. Munich, L.R.C.P. Edin., Lecturer in Dermatological Pathology at the Hospital for Diseases of the Skin, Blackfriars.
SUTTON, H. E. C., M.D. Liverp., D.P.H., Deputy Medical Officer of Health and Deputy School Medical Officer for Chester.
TILLEY, J. B., M.D. Durh., B.Hy., D.P.H., Assistant County Medical Officer for Northumberland.

London County Council Hospital Staff.—The following appointments, promotions, and transfers are announced. A.M.O. (I) or (II) = Assistant Medical Officer, Grade I or II.

GREENFIELD, C. R. M., M.B. Lond., D.P.H., Senior A.M.O. (I), Western;
ROBERTS, G. C. D., M.B. Camb., F.R.C.S. Eng., A.M.O. (I), Lewisham;
WILSON, R. A., M.D. Glasg., D.P.H., A.M.O. (I), St. Luke's, Chelsea;
LAWES, C. H. W., M.B. Sydney, F.R.C.S. Eng., A.M.O. (I), Bethnal Green;
ROWLANDS, R. D., F.R.C.S. Edin., A.M.O. (I), St. James';
THOMAS, R. F., M.B. N.Z., A.M.O. (II), Queen Mary's, Sidcup;
RICHARDS, W. F., M.B. Camb., M.R.C.P. Lond., A.M.O. (II), Colindale;
STEPHEN, J. L., M.B. Aberd., F.R.C.S. Edin., A.M.O. (II), St. Pancras;
COPITHORNE, R. E. C., M.R.C.S. Eng., D.C.H., A.M.O. (II), Lambeth;
BERGER, B. D., M.R.C.S. Eng., House Physician, St. Olave's;
JONES, W. A., M.R.C.S. Eng., House Physician, St. James';
SCOTT, W. A. M., M.B. Aberd., House Physician, St. Mary Abbots;
DROSSO, VICTOR, M.R.C.S. Eng., House Physician, St. Leonard's;
MCDONALD, H. A., M.R.C.S. Eng., House Physician, St. Andrew's;
GLENNIE, CICILY M., M.B. Aberd., House Physician, Queen Mary's, Carshalton;
BLOMFIELD, L. B., M.R.C.S. Eng., House Surgeon, Queen Mary's, Carshalton;
LEONARD, F. R., M.B. N.Z., F.R.C.S. Eng., Senior A.M.O. (II), Archway;
JACOBS, A. L., B.M. Oxon., M.R.C.P. Lond., D.C.H., Senior A.M.O. (II), Mile End;
DAVIS, ELI, M.D. Manch., M.R.C.P. Lond., Senior A.M.O. (II), St. Stephen's;
MCQUISTON, T. A. C., M.D. Belf., A.M.O. (I), Colindale;
OLDAKER, JOAN M., M.R.C.S. Eng., A.M.O. (I), St. Leonard's;
PHILLIPS, JOHN, M.R.C.S. Eng., A.M.O. (I), St. Peter's;
CROWE, ELSIE V., M.B., F.R.C.S. Edin., Senior A.M.O. (II), St. Andrew's;
LATTER, ROSALIND B., M.B. N.Z., M.R.C.P. Lond., A.M.O. (I), Paddington; and
BOYLE, A. K., M.B. Glasg., A.M.O. (I), St. James'.

Certifying Surgeon under the Factory and Workshop Acts: Dr. G. C. HOBBS (Broughton District, Southampton).

Births, Marriages, and Deaths

BIRTHS

FAISON.—On Jan. 31st, at Edinburgh, the wife of Dr. J. Butler Faison—a daughter.
GILDING.—On Jan. 27th, the wife of Dr. H. P. Gilding, Sheffield House, near Alcester—a daughter.
HAMILTON.—On Jan. 29th, at Nuffield House, Guy's Hospital, the wife of Dr. Henry Alexander Hamilton—a son.
PAGET.—On Jan. 28th, the wife of Dr. M. Y. Paget, of Exeter—a daughter.

DEATHS

ADAMS.—On Jan. 27th, at Aldersgate-street, E.C., John Adams, F.R.C.S. Eng., aged 86.
BEARDSLEY.—On Jan. 23rd, at Sheringham, Norfolk, Richard Henry Beardsley, L.R.C.P. Edin., late of Grange-over-Sands, aged 73.
CRICHTON-BROWNE.—On Jan. 31st, at Crindau, Dumfries, Sir James Crichton-Browne, M.D., LL.D., D.Sc., F.R.S., aged 97.
DYAS.—On Jan. 25th, at Hove, Albert Edward Mortimer Dyas, L.R.C.P.I., L.R.C.S. Edin., formerly of Manchester, aged 74.
FAIRWEATHER.—On Jan. 25th, at Hadley Wood, Herts, David Fairweather, M.D. Edin., J.P.
HODGINS.—On Jan. 30th, at Bournemouth, Walter W. Hodgins, M.D. Durh., of Bloemfontein, South Africa, aged 70.
KNIGHT.—On Jan. 30th, George David Knight, M.D. Aberd., J.P., of Leigham-avenue, S.W.
NORTON.—On Jan. 28th, at Kennington Park-road, Henry Harvey Norton, M.R.C.S. Eng., aged 73.
PARKER.—On Jan. 26th, at High Wycombe, Charles Arthur Parker, F.R.C.S. Edin., aged 74.
SMITH.—On Jan. 30th, at Selhurst-road, South Norwood, Walter Hugh Montgomery Smith, M.R.C.S. Eng., aged 64.
STOKER.—On Jan. 28th, at Hemel Hempstead, Graves Stoker, F.R.C.S.I.
SWABEY.—On Jan. 27th, at Bath, Lieut.-Col. Maurice Swabey, M.R.C.S. Eng., late R.A.M.C., in his 70th year.
WEBB-WARE.—On Jan. 26th, at Saxlingham, Nethergate, Hugh Robert Stawell Webb-Ware, M.A. Oxon., M.R.C.S. Eng., J.P., aged 72.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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ADDRESSES AND ORIGINAL ARTICLES

ERYTHEMA NODOSUM AND PULMONARY TUBERCULOSIS *

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THE majority of children with erythema nodosum give a positive reaction with tuberculin. The frequency with which tuberculous infection occurs in erythema nodosum, however, varies somewhat in different countries. It is very high in Sweden, amounting to about 95 per cent.; in England it is about 70 per cent. (Collis 1931–33, 1935).

On the whole the incidence of tuberculous infection among children with erythema nodosum is always higher than that among children in general. If all children aged 1–15 are considered together the proportion with tuberculous infection is normally about 25 per cent.—a figure varying naturally in different countries, towns, and rural districts. But if we study the conditions in different age-groups (Table I) the difference between those with the

TABLE I—INCIDENCE OF POSITIVE TUBERCULIN REACTIONS: ERYTHEMA NODOSUM (800 CASES) COMPARED WITH THE NORMAL

Age-groups in years	*1–3*	*3–7*	*7–10*	*10–15*
Children with erythema nodosum (per cent.) ..	96·4	95·6	96·5	95·8
Children in general (per cent.)	10	25	30	40

erythema and normal children becomes still greater, the tuberculin test showing that children with erythema nodosum are infected with tuberculosis much more frequently than are children in general. Since this is no accidental occurrence but characteristic for erythema nodosum in all countries, it is reasonable to suspect a connexion between tuberculosis and this cutaneous eruption.

TABLE II—SIGNS OF DISEASE IN TUBERCULIN-POSITIVE REACTORS

	Findings (clinical and X ray)		
	Positive.	Negative.	Total.
Children with erythema nodosum .	248 (68·5%) ..	48 (13·3%) ..	362
Children in general	70 (7·1%) ..	878 (90·6%) ..	969

Questionable cases are excluded.

This suspicion is confirmed to a great extent if a close examination is made of tuberculin-positive children with erythema nodosum. If routine tuberculin tests are made on children in general it is rarely possible to demonstrate clinically any active tuberculosis among those giving a positive reaction, only about 5–10 per cent. showing manifest signs. It is quite the reverse in those affected with erythema nodosum, for the majority present signs of active disease (Table II).

X RAY FINDINGS

Since the tuberculous infection, with but few exceptions, takes place aerogenously, in my experience an X ray examination furnishes very important information. In Table II the negative X ray findings also include changes that indicate a healed process, such as calcified or indurated foci. Among positive findings have been classified all those children manifesting the following: definite extrathoracic disease; pathologically enlarged hilar shadows; infiltration in the lung parenchyma (instances where röntgenological signs of healing are wanting). The characteristic feature of these changes is the absence of sharp demarcation and the homogeneous and soft appearance of the lesions.

Thus both röntgenological and clinical examination reveal that the great majority of children with erythema nodosum are carriers of active pulmonary disease, lesions of the tracheobronchial glands or extrathoracic processes. We are dealing, therefore, not only with a tuberculous infection but with an active pulmonary or extrathoracic disease. X ray examination of tuberculin-positive children in general shows on the contrary that such children rarely suffer from active diseases.

These röntgenological changes, however, are in no way characteristic of tuberculosis. It is only by subsequent examination that they can be shown to develop in a different manner from ordinary pneumonic processes. They are more chronic and remain practically unchanged for several months. After a year or two calcified foci can frequently be shown in the sites of the previous infiltration. It is true that calcification is not in itself a pathognomonic sign that the lesion was tuberculous, but any other cause is so very unusual that one is practically always justified in regarding it as evidence of the tuberculous origin of the process.

The fact that it is seldom possible to obtain anatomical control material has of course helped to make the interpretation still more confused. In those exceptional cases where the children died—generally from meningitis or miliary tuberculosis—the post-mortem examination furnished proof that the indurations of the lung observed during life corresponded to fresh, genuine tuberculous changes.

SWALLOWED SPUTUM

In rare cases the tuberculosis is not intrathoracic but is localised at sites more accessible to direct inspection, palpation, aspiration, and biopsy, definite proof being obtained during life. But even when intrathoracic changes are met with in erythema nodosum very often it has been possible to prove during life and during the active stage that it really is tuberculosis—by demonstrating the bacilli themselves. As a rule children have no sputum; if they do have any, they swallow it. It is therefore rarely possible to demonstrate tubercle bacilli in the ordinary way. The swallowed sputum can be recovered, however, by washing out the stomach, and the bacilli may be found in the gastric contents. This examination has also been made on tuberculin-positive subjects with erythema nodosum, and it has been possible to show that a large proportion excrete virulent tubercle

TABLE III—TUBERCLE BACILLI IN GASTRIC CONTENTS

	Röntgenological changes.		*Age—*	
	Extensive.	Minor.	*1–7*	*10–15*
Bacilli present (per cent.) ..	78 ..	24 ..	57·7% ..	47·5%
Bacilli absent (per cent.) ..	22 ..	76 ..	42·3% ..	52·5%

bacilli. The younger the child and the more extensive the pulmonary process demonstrated röntgenologically the more frequently the bacilli are shown. This appears from the result of the examination of 119 cases summarised in Table III. These figures are

* Ingleby lectures for 1937 delivered at the University of Birmingham.

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minimum values; other investigators (Opitz 1933) have obtained a higher incidence of positive findings. The farther one pushes this form of bacillary examination and the more tests one carries out, the higher will be the figures obtained. The above investigation is, as a rule, the result of a single test and the bacillus was demonstrated indirectly by inoculation in guinea-pigs.

The fact that bacilli were demonstrated proves that the tuberculosis is active. Such a high incidence of excretion of bacilli is not found in examining tuberculin-positive children in general. In one such examination not more than 6 per cent. of the children were shown to excrete bacilli (Barfred 1936). The older the tuberculous process the less the prospects of demonstrating bacilli, and after a year it is relatively seldom that the gastric contents will contain bacilli. Thus a positive finding indicates not only that the process is active but also that it is recent.

ONSET OF TUBERCULIN SENSITIVITY

One cannot, however, determine the exact age of a tuberculous process without knowing the date of the onset of tuberculin sensitivity. Table IV shows the result of the test in children before and after the onset of the fever preceding the eruption of erythema nodosum. We have been fortunate to observe 133 children who were tested with tuberculin before they were taken ill with erythema nodosum. When a positive reaction was obtained, the tuberculin test was as a rule made cutaneously or percutaneously. Since these tests do not exclude absolutely the possibility of a tuberculous infection, only those cases subjected to an intracutaneous test (0·1–3·0 mg. of tuberculin) have been shown in Table IV. It includes also only those in which erythema nodosum was the first clinical symptom of tuberculosis. It will thus be seen that all these children gave a negative reaction before the fever preceding the erythema, and that all of them reacted positively during and after the fever.

TABLE IV—MANTOUX TESTS BEFORE AND AFTER ONSET OF INITIAL FEVER IN 34 CHILDREN WITH PRIMARY ERYTHEMA NODOSUM

	Relation of test to onset.								
	Before.								After.
	Over 1 yr.	*1 yr.*	*6 m.*	*3 m.*	*2 m.*	*1 m.*	*2 wk.*	*1 wk.*	*Under 1 wk.*	
Positive	0	0	0	0	0	0	0	0	0	34
Negative	19	3	6	1	1	1	1	0	2	0

This signifies that there is no tuberculin sensitivity before the eruption of erythema nodosum, and that tuberculin sensitivity is constantly found during and after the erythematous eruption. Thus the erythema appears at the time when the child becomes tuberculin-sensitive. Since it is not a question of an accidental but of a constant anergy before the eruptive fever, it must indicate that the fever marks the boundary line between the pre-allergic stage and the stage of manifest tuberculous infection. Such a fever, appearing simultaneously with tuberculin sensitivity at the manifestation of tuberculosis, is well known; it is the so-called initial fever. Accordingly the fever preceding and accompanying erythema nodosum in tuberculin-positive children must be considered as the initial fever of tuberculosis.

Sensitivity to tuberculin arises at the end of the period of incubation, which lasts 3–8 weeks. If erythema nodosum behaves in the manner here described, the fever should set in 3–8 weeks after the tuberculous infection has taken place; this does in fact seem to be the case. In 13 cases of erythema nodosum accurate information was obtained concerning the time of exposure to infection, and this occurred so far in advance of the fever that the interval corresponded to the incubation period of tuberculosis (Table V).

TABLE V—INCUBATION PERIOD OF PRIMARY TUBERCULOUS ERYTHEMA NODOSUM

Interval in weeks between tuberculous infection and development of erythema.						Total.
<3	*3–4*	*4–5*	*5–6*	*6–7*	*7–8*	*>8*	
0	4	2	4	2	1	0	13

Specificity

From what has been said it is thus evident that erythema nodosum in these children has occurred simultaneously with the tuberculous allergy (tuberculin sensitivity, perifocal reaction, fever), when the period of incubation of the tuberculosis has expired. The erythema itself has been regarded as an expression of this allergy. Such a conception agrees very much with the clinical picture, the anatomical appearance, and the local absence of tubercle bacilli in the nodules.

The sudden appearance, disappearance, and speedy morphological transformation of the nodules are incompatible with a true tuberculous process. That the nodules are not to be regarded anatomically as tuberculous is shown by their histological structure. The nodule is not made up of the typical tissue, but is characteristic of a non-specific acute inflammatory process. No histological pictures have ever been shown to prove a tuberculous origin. Nor has it been possible to demonstrate tubercle bacilli in all the examinations made for that purpose, either in Scandinavia or England. A few isolated reports of positive findings are on record, and even if these findings must be considered as conclusive, the organisms may have originated from an admixture of blood containing bacilli—bacillæmia during the primary stage of tuberculosis—and need not indicate that the anatomical changes have been produced by direct focal action of tubercle bacilli.

These facts indicate that the eruption cannot be regarded as specific. Erythema nodosum must be a non-specific syndrome. This conception of the erythema agrees very well with a number of other relevant observations. One of these was mentioned at the beginning of this paper—that erythema nodosum occurs in other children besides those affected with tuberculosis. There are no histological or clinical differences, however, between erythematous nodules occurring in tuberculin-negative and tuberculin-positive individuals. In the former the erythema occurs as a rule in association with an acute infection or other conditions that may possibly influence the allergy of the individual. Urticaria, for instance, appears not infrequently in conjunction with an acute infection. I will return to these tuberculin-negative cases of erythema nodosum later.

The view that the erythema is a non-specific allergic manifestation of disease agrees also very well with the particularly high degree of allergy at the manifestation of the primary tuberculosis. If we regard as the average value the degree of the tuberculin sensitivity in tuberculin-positive children in general, we shall find that it differs from that present during the eruption of erythema nodosum. The latter children are as a rule more sensitive to tuberculin than the former (Table VI).

The erythema nodosum does not occur in infants, in whom the tuberculous allergy is but slightly developed even during the fresh primary stage.

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In 40 infants with active tuberculosis positive tuberculin reactions were elicited with as high dilution of tuberculin as 0·001 mg. in only one instance, in 67·5 per cent. of the cases with 0·01 mg., and in 30 per cent. with 0·1 mg. By way of comparison I may mention that

TABLE VI.—TUBERCULIN SENSITIVITY IN CHILDREN WITH ERYTHEMA NODOSUM COMPARED WITH THAT IN TUBERCULIN-POSITIVE CHILDREN IN GENERAL

	Degree of tuberculin sensitivity in mg.								Total
	0·000001	0·00001	0·0001	0·001	0·01	0·1	1	10	
Children with erythema nodosum.	1	9	3	49	195	14	0	0	271
Tuberculin pos. children in general.	0	0	0	3	160	124	34	0	321

in 162 cases of fresh primary tuberculosis without erythema nodosum in children above infant age, a positive tuberculin reaction was obtained with 0·0001 mg. in one case, with 0·001 mg. in 10 per cent. of the cases, and with as low dilution as 0·1 mg. in only 18·5 per cent.

THE "POST-PRIMARY" TYPE

The conception of erythema nodosum as a non-specific allergic phenomenon agrees also very well with the manner in which it appears in individuals who were infected a long time ago—the so-called "post-primary" erythema nodosum. In our experience with children such cases have indeed been rare. Among a total of 800 cases of erythema nodosum only 16 belonged to this category. A careful scrutiny of these shows that the eruption was preceded by an acute infection of some kind. The erythema did not appear until immediately *after* (measles) or *towards the end* (pertussis) of the acute infectious disease. Judging from our experience so far, this is a constant phenomenon, which is quite reverse to the conditions in erythema nodosum in tuberculin-negative children after an acute infection. In such children the erythema usually appears *during the progress* of the acute infection and not after it has run its course. This dissimilarity indicates that the mechanism producing erythema nodosum is different in the two cases. The post-primary tuberculous erythema nodosum appears during recovery from the effect of the acute infection. The tuberculin-negative cases of erythema nodosum are ushered in as an immediate effect of this acute infection.

EFFECT OF ACUTE INFECTIONS

The explanation of the development of post-primary tuberculous erythema nodosum can most readily be obtained if we consider the well-known effect of measles in temporarily decreasing the tuberculin sensitivity of a tuberculous child; this increases again some days after the fever has subsided. While the sensitivity to tuberculin is minimum, the child is, allergically speaking, at the same starting-point as when it first became allergic at the manifestation of primary infection: the tuberculin sensitivity increases rapidly. It is at a corresponding point that the ordinary tuberculous erythema nodosum arises, and it is at this point too that the post-primary erythema appears. Thus, a few days after fever has subsided after measles, there is a new elevation of the temperature curve, in the course of which the erythema makes its appearance.

Most acute infections have more or less the same effect as measles. The time relationship between the onset of the acute infection and the eruption of erythema nodosum varies somewhat, according to the time when the decrease in allergy sets in and its duration. Thus in pertussis there is an interval of several weeks between the onset of the whooping-cough and the erythematous eruption.

It will thus be seen that even erythema nodosum in children with old tuberculous foci can be explained as a tuberculous allergic phenomenon. An experimental observation that has been made on several occasions and by different investigators, and which therefore must be regarded as conclusive evidence, is that *an injection of tuberculin can provoke a new eruption of erythema nodosum.* If a tuberculin-positive child in the convalescent stage after an erythema nodosum is injected with a sufficient dose of tuberculin to produce a certain general reaction, this may sometimes provoke a new eruption of erythema nodosum. It is a well-known fact that such a dose of tuberculin produces an undulation in the allergic level, and it is during this undulation that the erythema occurs.

We have thus dealt with the tuberculous type of erythema nodosum in its different forms, the primary and the post-primary. In summary it might be said that erythema nodosum is in itself a non-specific allergic manifestation of disease, which in children finds its most favourable conditions of development in the tuberculous allergy. It occurs as a concurrent phenomenon in the increase of this allergy, particularly at the time of the manifestation of the primary tuberculosis. In addition to this primary type there is a rather rare post-primary form of tuberculous erythema nodosum. The latter occurs when the allergic state is modified, for instance by certain acute infections.

Ætiology

That erythema nodosum is ætiologically a non-specific syndrome is evident from the fact that it occurs occasionally in other infections besides tuberculosis. As mentioned in the introduction the frequency with which tuberculosis, on the one hand, and other infections, on the other, are the cause of erythema varies in different countries. Whereas in Sweden only 5 per cent. of the cases of erythema nodosum are non-tuberculous, in England, for instance, the percentage is six times greater.

As I have already pointed out, there is no clinical, histological, or bacteriological differences between the tuberculous and the non-tuberculous forms of erythema nodosum. I have once observed that the same child has primarily suffered from a non-tuberculous erythema nodosum, and secondarily, six months later, from a tuberculous erythema. The condition for the development of the erythema, both in tuberculin-positive and in tuberculin-negative children, is a predisposition in the individual to react in the manner described. Erythema nodosum agrees in this respect with other allergic manifestations of disease. This predisposition is found only in certain individuals. It is much more common among women than among men, in some families more than in others, and in one country more than another. The degree of the predisposition varies too; in some the erythema occurs repeatedly—in one tuberculin-negative case there were no less than 10 eruptions, at intervals of a year or so, and each time after an attack of tonsillitis—but in the majority it appears only once in their lifetime.

UPPER RESPIRATORY INFECTIONS

Tonsillitis or other acute infections of the upper respiratory tract are the most common conditions that precede erythema nodosum in tuberculin-negative cases. In 34 children with such an erythema

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nodosum I encountered the following infections that might possibly be the cause of the erythema:—

	Cases.		Cases.
Acute pharyngitis ..	13	Enterocolitis	1
Tonsillitis	8	Rheumatic fever ..	1
Otitis	2	Acute infection absent	3
Pneumonia	2	No data	2
Tonsillary abscess ..	1		
Septic wounds	1	Total ..	34

It is noteworthy that in three of the cases no other demonstrable disturbance occurred than the erythema, which by no means signifies that every kind of infection was absent in these cases.

Erythema nodosum in a tuberculin-negative child can also occur as a result of other infections besides those mentioned above; it has, for instance, been described in syphilis and lymphogranuloma inguinale. I should like to deal more extensively with two of the above-mentioned infections—namely, pharyngitis or tonsillitis, which are the most common, and rheumatic fever, which seems to be among the rarest infections producing erythema nodosum.

In most of the cases, 24 out of 34, the acute infections were catarrhal diseases of the upper respiratory tract. It is not surprising that these entities are the most common causal infections, since the bulk of childhood infections are comprised by those maladies. Every acute pharyngeal infection, however, is not able to provoke erythema nodosum to the same degree in a predisposed individual. From Collis's investigations it appears that it is especially those infections caused by hæmolytic streptococci which are followed by erythema nodosum. Collis has also shown that the majority of all tuberculin-negative children with the erythema react positively with an endotoxin made by hæmolytic streptococci, isolated from their tonsillitis and other pharyngeal infections. I have also had the opportunity of testing this toxin on five tuberculin-negative children with erythema nodosum, in all of whom I was able to confirm a high degree of sensitivity to the toxin. It seems probable that Collis is right in assuming that erythema nodosum is an expression of streptococcal allergy in certain cases. In some of the erythemas in tuberculin-negative individuals, however, no hypersensitivity to the streptococcus toxin is elicited (Collis), and one must necessarily suppose that these individuals are allergic toward some other bacterial allergen.

RHEUMATIC FEVER

The opinion that rheumatic fever may be the cause of erythema nodosum has prevailed for the last 50 years, and this opinion has especially been advocated in England. The evidence advanced in support of this conception has not been convincing enough to be accepted. This opinion has mainly been based on the fact that rheumatic pains not infrequently occur in association with the erythema, especially in adults. But these pains are by no means characteristic and they occur just as often in tuberculin-positive as in tuberculin-negative individuals with erythema nodosum. Occasionally it has been possible to demonstrate objective cardiac symptoms in support of the rheumatic fever origin. In several such cases, however, no proof has been submitted to show that the murmur heard was not accidental. Even in other cases with evident organic cardiac lesions it was not proved that this change became manifest or intensified during the erythematous eruption. Neither was it shown that the two manifestations of disease were in any way associated with one another. Finally, the common and serious mistake has been not to determine whether the tuberculin reaction was positive or negative. It is only in definitely tuberculin-negative individuals that it is possible to show that erythema nodosum is a manifestation of any agent other than tuberculous allergy. Even if a rheumatic endocarditis appears simultaneously with an eruption of erythema nodosum, in the presence of active or latent tuberculosis, there is all the more reason for assuming that the tuberculosis and not the rheumatic fever is the cause of the erythema nodosum. At any rate, in such a case it cannot be regarded as proved that the erythema owes its occurrence to the rheumatic allergy. That a rheumatic fever may be the cause of an erythema nodosum is shown by the following case.

A boy, aged 11, became ill with erythema nodosum, during which he showed, in addition to troublesome symptoms of polyarthritis, signs of endomyocarditis that resembled a rheumatic cardiac change. He did not react to 10 mg. of tuberculin; the test was repeated six weeks later with the same result. When discharged from hospital he was still suffering from slight valvular heart disease. The only discernible cause of the erythema was the rheumatic affection.

Acute rheumatic fever, therefore, is obviously one of the diseases that can be intimately associated with erythema nodosum. The part it plays, however, has been greatly exaggerated, and at least in Sweden it is but rarely the cause of the eruption. Among our 800 cases that just referred to is the only instance of erythema caused by rheumatic fever.

Conclusions

It is thus my opinion that erythema nodosum is to be regarded as a *non-specific allergic cutaneous eruption*, which appears especially in tuberculosis and occasionally in other infections, and may possibly be provoked by non-infectious agents. This view is undoubtedly held by the majority of pædiatricians in Scandinavia and on the Continent, and I know that it has many advocates also in England. There is, however, a group of physicians (Symes 1928, Fornara 1930) who hold that the erythema is an expression of a *specific* infectious disease, appearing only when quite exceptional allergic conditions are present in the affected person. Quite apart from the fact that no other instance of an acute specific infectious disease with such peculiar allergic demands on the patient has been seen so far, there are a number of other peculiarities in the manner in which the erythema appears that argue against such a view. I shall here draw attention to only two of them: the possibility of provoking a new attack of the disease in tuberculous subjects by the injection of tuberculin (Ernberg 1921), the great tendency in certain cases to relapses, which is quite foreign to the nature of a specific exanthematous disease.

The epidemics of erythema nodosum that have been described and that form one of the supports of its being an expression of an acute specific infectious disease are given a natural explanation by the view advanced here of the origin of the erythema. Let us suppose, for instance, that a group of children is simultaneously infected with tuberculosis, and that among these children there are several having a predisposition to react with erythema nodosum, on the development of allergy. Then we should expect that an eruption of erythema would occur after the expiration of the period of incubation of tuberculosis. Since the period of incubation varies only slightly, the tuberculous allergy would appear at approximately the same time and thereby an apparent endemic of the erythema would occur. Several such endemics of erythema nodosum of this

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kind have been described and I have personally had the opportunity of studying 10 of them.

PRACTICAL SIGNIFICANCE

The importance of erythema nodosum is that this disease entity may serve as a diagnostic agent for detecting a fresh tuberculous infection. In this way the erythema makes it possible for us to detect the presence of active tuberculosis at a very early stage of the disease. It is of great value too in revealing the source of infection. In a tuberculin-positive individual it nearly always indicates that the tuberculous infection took place 3–8 weeks previously. This information greatly facilitates the discovery of the cause of the infection. Erythema nodosum in a tuberculin-negative child seems to offer no guidance or assistance in our clinical work.

The tuberculous erythema nodosum in itself is not a sign of any special malignancy. Everything considered, primary tuberculosis behaves in exactly the same way whether there is erythema nodosum or not. On the contrary, it may be regarded as a favourable syndrome for the individual, in that the eruption helps in the diagnosis of a tuberculous infection at a very early stage, and thus making it possible to commence appropriate treatment immediately.

DIAGNOSIS OF CLUBBED FINGERS

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A simple inspection of the patient's outstretched fingers is a part of the clinical examination that can provide information of considerable value in diagnosis. The discovery of clubbed fingers is at the same time satisfying to the clinician and condemning to the patient, for it is a condition long known to be associated with grave disease. Let us suppose that the presence of clubbing of the terminal phalanges is obvious; there will then be no dispute on the authority of the sign. But more often it happens that academic doubt is expressed on the degree of clubbing present, so that the diagnosis of "slight curving" or of "suspicious early clubbing" is made. Clubbing must surely be either present or absent; its presence signifies disease which its absence does not exclude. In our zeal we tend unwittingly to deceive ourselves over the equivocal case, yet were we able to establish criteria of diagnosis this problem would be simplified. It has rightly been said (West 1897) that clubbing is one of those phenomena with which we are all so familiar that we appear to know more about it than we really do.

ÆTIOLOGY

Before attempting to put forward any such standards of judgment let us briefly review the modern conception of clubbed fingers and of their ætiology. If it is realised that in any series of healthy individuals the peripheral circulation and the conformity of the fingers themselves both vary within wide limits of the so-called normal, then it is easier to account for the anomalies relating to clubbing. For example, even in the diseases with which it is most frequently associated clubbing is really far more often absent than present. It is manifestly a malady of the nail beds, or, more correctly, of the soft tissues between the nail bed and the bone. Although the true pathology is still in dispute it seems likely that chronic passive congestion of the capillaries of the nail bed brings about an œdema of the tissues deep to it, which in turn is followed by trophic changes resulting in clubbing. An essential contributory factor that must be present before the characteristic reaction will occur is a chronic anoxæmia of the blood in the terminal arterioles (Campbell 1924) such as obtains in many states of pulmonary and cardiac disease. It is thought that all venous blood contains toxic substances tending to provoke the typical changes in the fingers. Normally these toxins are removed from the blood in its passage through the lungs, hence pulmonary disease predisposes to clubbing.

The peculiar selectivity for the digits as the seat of the process may perhaps be explained by a certain vulnerability of the capillaries in this part of the body where the circulation is ordinarily slow. Thus cyanosis may be observed in the nail beds before it is apparent elsewhere, particularly in pneumonia and in chronic and miliary pulmonary tuberculosis. The pathology of clubbing of the toes is precisely similar. An exaggeration of the same morbid process is also held responsible for the changes which arise in hypertrophic pulmonary osteo-arthropathy. Many other less satisfactory theories have been propounded. These include vitamin-A deficiency, the "arthritic diathesis," an increase in subungual fat, and an ætiology akin to amyloid disease, but they have met with full discussion in previous communications and need not detain us here.

From the foregoing account it is evident that clubbing is unlikely to arise in the event of a simple mechanical obstruction to the veins. Therefore clubbed fingers do not follow superior caval obstruction, neither are they found in cases of œdema due to congestive heart failure, or to thrombophlebitis. The conditions in which clubbing is commonest may be classified as follows:—

Pulmonary disease.—Bronchiectasis, lung abscess, chronic empyema, primary or secondary lung tumours, fibroid pulmonary tuberculosis with excavation, chronic broncho-pneumonia.

Cardiovascular disease.—Congenital morbus cordis, infective endocarditis, polycythæmia rubra. It is rare in acquired heart disease, but unilateral clubbing has been recorded with aortic aneurysm.

Mixed group.—This includes the cases described in association with chronic jaundice, cirrhosis hepatis, enterogenous cyanosis, &c. A familial type, of unknown ætiology, is also described. The varieties of true clubbing in this group are so rare as to be of academical interest only.

DIAGNOSIS

We are concerned here with the clinical diagnosis of clubbing of the fingers and of the less obvious cases in particular. Clubbing is commonly seen first in the thumb and index digit, and spreads to the others later. The process starts at the root of the nail just beyond the interphalangeal joint as a definite, firm, transverse ridge more obvious on the dorsal aspect of the finger. The overlying skin is smooth and shiny, the patient often complaining that the cuticle has begun to grow more rapidly over the nail. A vascular turgescence of the nail bed in the early stages imparts a lilac hue, and in the well-developed clubbed finger a full, rounded, and cyanotic appearance. The sluggish circulation is apparent from the slow return of colour after slight pressure on the nail (Witherspoon 1936). As the deformity develops the base of the nail becomes elevated so that its outline may be discerned beneath the skin. In severe clubbing the nail can be rocked backwards and forwards, giving the impression that

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it is floating on a soft œdematous pad. If the clubbing is long-standing, as in congenital heart disease, the terminal phalanx may become hyperextended. Muscular wasting of the hands and fingers accentuates these changes, especially in the milder cases.

The sign is said to be eight times more common in men than in women. No age is exempt. With lung abscess it may appear in as brief a period as ten days, but more usually it takes a few weeks or even months to be established. In cases of pulmonary sepsis treated by surgical drainage or lobectomy clubbing may recede in an equally short interval of time (Craig 1937). Clubbing of prolonged duration probably never entirely disappears. Although they often look sore clubbed fingers are painless, except possibly with a very rapid onset. Gross clubbing produces bulbous finger-ends to which have been applied such picturesque epithets as "serpent's head," "parrot's beak," "drumstick," and in France "doigts Hippocratiques," an allusion to the Father of Medicine who recognised clubbing as a sign of empyema and advanced pulmonary tuberculosis. Radiograms of clubbed fingers usually show no evidence of bony change, but in chronic severe clubbing an irregular, mossy, or burr-like proliferation of the distal half of the terminal phalanx may be seen; in a few instances long spur-like projections are present.

The condition of clubbing has to be differentiated from certain other disorders of the fingers. Notable among these is chronic paronychia, but here it is the soft tissues at the base of the nail that are swollen, not the nail bed. Heberden's nodes are bony swellings in the elderly distal to the interphalangeal joints, and can thus be distinguished from the clubbing deformity. Chronic infective arthritis causes peri-articular swelling. In these conditions there is no alteration in the conformity of the nail bed. A subungual whitlow may resemble a clubbed finger, but the associated pain and the absence of changes in other fingers will serve to define it. Various occupations, such as boot-making, saddlery, and sailmaking, after long years modify the shape of the fingers by broadening or thickening them with callosities; these should not be confused with clubbing.

THE PROFILE SIGN

From what has already been said it is manifest that the diagnosis of clubbing of the fingers is one of some importance since it may, for example, draw attention unexpectedly to the chest as the seat of the patient's symptoms. In those cases where the signs of clubbing might seem to be doubtful a consideration of the silhouette of the terminal phalanges provides a simple clue to the identity of the condition. From a perusal of the illustrations it will be seen that the normal nail proceeds from the finger at an obtuse angle of about 160° (Fig. 1). This is peculiarly well seen in the normal thumb. When "curving" is present the fundamental angle between phalanx and nail is undisturbed, but the distal part of the nail is curved downwards, maybe very considerably (Fig. 2). Most finger-nails are slightly curved, with the obvious exception of nails that show koilonychia; some distal curving of the nail may, therefore, accompany clubbing. Clubbing can be differentiated from curving, and, indeed, from other conditions, because even in its mildest form *this essential angle is characteristically obliterated* (Fig. 3). With gross clubbing the angle at the base of the nail becomes greater than 180° and projects (Fig. 4). In paronychia this angle again bears its normal relations, and it is the inflamed soft tissue round the nail base which protrudes (Fig. 5). Even when pronounced curving accompanies paronychia it should not be confused with clubbing, because the base angle of the nail is always preserved. The prominence produced by a Heberden's node lies still more proximally, and rarely engenders diagnostic difficulty (Fig. 6).

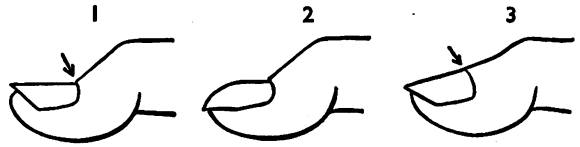

FIG. 1.—Normal finger, showing base angle of nail (usually about 160°).

FIG. 2.—"Curving" of nail, a variation of the normal. N.B.—Essential base angle is preserved.

FIG. 3.—Mild clubbing. N.B.—Base angle obliterated. (Clubbed finger-nails may also be curved.)

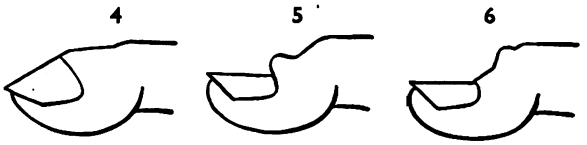

FIG. 4.—Gross clubbing ("drumstick," &c.). Base of nail projects. N.B.—Diameter of finger at nail base is increased in both dimensions.

FIG. 5.—Chronic paronychia. Fundamental base angle of nail unaltered.

FIG. 6.—Heberden's node. Base angle of nail normal.

It is, unfortunately, never possible to emphasise the minor degrees of organic change, so commonly encountered in disease, without perhaps ruthless dogmatism. This method of describing the deformity that characterises the clubbed finger has proved to be of some value when attempting to explain the condition to students. It is, therefore, hoped that it will be found helpful to the clinician in those many difficult cases that confront him where there are small, yet not less significant, degrees of clubbed fingers.

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PROGNOSIS IN MALIGNANT DISEASE OF THE TESTICLE

A FOLLOW-UP OF THIRTY-EIGHT CASES *

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MALIGNANT growths of the testicle have an unenviable reputation. This is due to the relatively late stage at which many of the patients come under observation, to the technical difficulties of the radical operation itself, and to the rapid dissemination of these growths by the blood and lymph streams. For these reasons, an attitude of mind has developed in connexion with the treatment of testicular tumours largely dominated by the hopelessness of the prognosis. For example, Romanis and Mitchiner [1] state:

* A paper contributed at a meeting of the Society of Radiotherapists of Great Britain and Ireland.

[1] Romanis, W. H. C., and Mitchiner, P. H. (1934) The Science and Practice of Surgery, London.

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"Prognosis is always grave, the majority of cases dying from metastases, often cerebral, about a year from the onset of the tumour." Current teaching has favoured a rather fatalistic outlook towards the disease, which would almost suggest that the cases are not worth operating on. For many years it has been my practice to teach that malignant disease of the testicle has not necessarily so gloomy a prognosis as the text-books often suggest.

The present paper is based on a series of 38 patients with malignant disease of the testicle treated by means of orchidectomy at St. Bartholomew's Hospital during the years 1920–33. In all of these the diagnosis was confirmed pathologically, and only one case during this period has been excluded from the series on the grounds of the absence of pathological data. The orchidectomy was a local operation, and no case was subjected to the radical operation. In addition to the orchidectomy, other treatment was carried out in some of the patients, including the excision of inguinal glands, the insertion of radon to abdominal glands, and the use of X rays.

Of the 38 cases now recorded, all but 4 have been traced. Details are set out in the Table. As the present paper is concerned almost entirely with prognosis, the other data are only discussed in so far as they have any bearing on this question.

RESULTS OF FOLLOW-UP

The results of the follow-up of the cases were as follows:—

Deaths:		
From operation	2	= 16
From disease	14	
Not traced	4	= 4
Cures:		
Five years, or more	15	= 18
Four years	2	
Three years five months	1	
Total		38

They are summarised in greater detail in the Table.

Deaths from operation.—Of the 38 cases 2 died as the result of operation. Case 6 died after 7 days. The cause of death was uncertain, and was probably a low-grade broncho-pneumonia, but no post-mortem was held. Case 25 died 12 days after operation as the result of gas gangrene, due to the ulcerated condition of the scrotal skin at the time of operation.

Deaths from disease.—14 cases out of the 38 died as the result of the disease, or their deaths were presumed to be due to disease.

There was evidence of metastases at the time of the orchidectomy in Cases 1, 19, and 34.

In this group 10 died within the two-year period; 3 are known to have lived for periods varying from 2 yrs. 10 mths. to 4 yrs. 1 mth. The latter patient had metastases in the inguinal glands at the time of operation, and was treated by X rays subsequently, and at no stage was free from disease. Case 2 was presumed to have died from the disease but no data are available as to when this occurred.

Cures, five years and over.—15 of the 32 cases operated on before April, 1932, survived the five-year period, giving a cure rate of 46·9 per cent.; of these cases 11 are still alive and well. Case 3 has not been traced since 1932 but had then survived a period of 11 years. Cases 8 and 11 died from unknown causes at periods of 10 yrs. and 9 yrs. 2 mths. respectively. Case 9 was in good health for 8 years and then developed a teratoma of the opposite testicle and now has abdominal secondaries.

Cures under five years.—The remaining 6 cases in the series of 38 were operated on within the five-year period. Of these 4 are now dead. The 2 survivors have lived for 4 yrs. 5 mths. and 4 yrs. 7 mths. respectively. Case 29 remained in good health for a period of 3 yrs. 5 mths. but has been untraced since.

HISTOLOGICAL DATA

In all of the cases investigated histological data were available. There were 19 teratomas and 19 seminomas. Under the heading "teratoma" have been included all the tumours having a definitely mixed structure. On the other hand, under the heading of "seminoma" have been included not only the tumours of this type but also those described in the earlier case records as alveolar sarcomas. There were no chorion epitheliomata in the series. Of the cases coming into the five-year cure group, 8 were teratomas and 7 were seminomas. Of the 2 cases coming into the under-five-year cure group, one was a teratoma and the other a seminoma.

DURATION OF SYMPTOMS

The average duration of symptoms before operation was as follows:—

	No. of cases.	Average duration.
Whole group	38	7·5 mths.
Five-year cure	15	7·4 "
Dying from disease	14	8·7 "

The average in the whole group of 7·5 months is a surprisingly long period and one that it should be possible to reduce considerably. It will be seen that the time difference between the five-year cure group and the cases dying from disease was approximately five weeks. This fact in itself suggests that the type of the disease is of outstanding importance.

DIFFERENTIAL DIAGNOSIS

It is not proposed here to discuss the clinical differential diagnosis of testicular swellings. It has to be recognised that diagnosis may often be extremely difficult even to the expert. There are of course mistakes, and in practice it is found that some patients have been subjected to preliminary treatment or preliminary operation without the true state of affairs having been ascertained. It must also be recognised that orchidectomy is at times carried out in the opinion that the testicular condition is malignant. The routine employment of the Wassermann test is essential in all cases.

The Aschheim-Zondek test has of recent years become of some importance in the diagnosis of testicular tumours. The routine use of this test is advocated. In all cases it may give a clue to the embryonal character of the disease, to the extent of the disease, and to its radiosensitivity. A positive result may thus be of great value in a doubtful case. Recurrence of the tumour in other sites may be recognised by the increase of prolan A in the urine. When this is being excreted in large amounts, there may also be hyperplasia of the prostate and seminal vesicles. Gynæcomastia may also occur.

IRRADIATION

Since this paper is concerned primarily with following up a series of cases, the question of irradiation is dealt with only in so far as this method has been employed.

Of the 38 patients 15 were treated by means of some form of irradiation in addition to orchidectomy. This included X rays, deep X rays, and the use of radon in one patient (Case 19). The X rays were employed in some cases therapeutically and in others prophylactically (so-called). Fairly high voltages were used, but Case 32 (1932) was the first one of the series to be treated with deep X rays.

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TABULAR SUMMARY OF RESULTS

Case	Date.	Duration (mths.).	Other signs.	Operation.	Histology.	Other treatment.	Survival after operation.
			DEATHS FROM OPERATION (2)				
6	Sept., 1922.	14	Nil.	Orchidectomy.	Seminoma.	Nil.	7 days.
25	March, 1930.	6	Scrotal skin ulcerated.	"	Teratoma.	"	12 days.
			DEATHS FROM DISEASE (14)				
1	Feb., 1920.	18	Glands left groin.	Orchidectomy and excision glands left groin.	Seminoma.	X rays 1921, 1922, 1923.	4 yrs. 1 mth.
2	April, 1921.	3	Nil.	Orchidectomy.	Teratoma.	Nil.	?
13	Oct., 1926.	24	"	"	Seminoma.	"	2 yrs.
15	Jan., 1927.	6	"	"	Teratoma.	3/27, X rays to deposits in liver.	4 mths.
16	May, 1927.	24	"	"	Seminoma.	Nil.	1 yr.
19	Feb., 1928.	4	Aortic glands.	Orchidectomy and radon to aortic glands.	Teratoma.	Radon to aortic glands.	7 mths.
24	March, 1929.	1	Nil.	Orchidectomy.	Seminoma.	X rays 4/29 and 7/29.	3 yrs. 1 mth.
27	Oct., 1930.	9	"	"	Teratoma.	X rays 2/32 to abdominal glands.	2 yrs. 10 mths.
28	August, 1930.	4	"	"	Seminoma.	X rays 12/30 to lumbar deposits and scar recurrences.	6 mths.
33	Dec., 1932.	6	"	"	Teratoma.	Nil.	1 yr. 1 mth.
34	May, 1932.	5	Huge abdominal metastases, also lungs and spine.	Orchidectomy to relieve weight.	"	"	2 mths.
36	Feb., 1932.	7	Nil.	Orchidectomy.	Seminoma.	Deep X rays 9/32 to glands in abdomen and neck.	9 mths.
37	Nov., 1933.	9	"	"	"	Nil.	1 yr. 11 mths.
38	Oct., 1933.	2	"	"	Teratoma.	Deep X rays.	1 yr. 6 mths.
			NOT TRACED (4)				
4	April, 1921.	6	Nil.	Orchidectomy.	Teratoma.	Nil.	—
5	Sept., 1922.	4	"	"	Seminoma.	"	—
23	August, 1929.	5	"	"	"	"	—
30	May, 1931.	4	"	"	Teratoma.	"	—
			CURES, FIVE YEARS AND OVER (15).				
3	Feb., 1921.	12	Nil.	Orchidectomy.	Teratoma.	Nil.	Not traced since 1932. 11 yrs.
7	Dec., 1923.	2	"	"	"	"	13 yrs. 4 mths.
8	August, 1924.	3	? abdominal glands.	"	"	X rays.	10 yrs.
9	April, 1925.	2	Nil.	"	"	Nil.	8 yrs. Well till 4/33. Then teratoma left testicle. Now abdominal secondaries.
10	March, 1925.	7	"	"	"	"	12 yrs. 1 mth.
11	Jan., 1925.	0·25	"	"	Seminoma.	Abdominal recurrence proved by section 9/25. X rays.	9 yrs. 2 mths.
12	April, 1926.	8	"	"	"	Nil.	11 yrs.
14	June, 1926.	4	"	"	Teratoma.	"	10 yrs. 10 mths.
17*	March, 1921.	18	"	"	Seminoma.	Excision scrotal recurrence 7/27. X rays.	16 yrs. 1 mth.
18	Sept., 1928.	12	"	"	"	"	8 yrs. 7 mths.
20	June, 1928.	12	"	"	"	Nil	8 yrs. 10 mths.
21	May, 1928.	15	"	"	Teratoma.	"	8 yrs. 11 mths.
22	Nov., 1929.	4	"	"	"	X rays.	7 yrs. 5 mths.
26	August, 1930.	6	"	"	Seminoma.	Nil.	6 yrs. 8 mths.
31	Sept., 1931.	6	"	"	"	"	5 yrs. 7 mths.
			CURES, FOUR YEARS AND OVER (2)				
32	Nov., 1932.	12	Nil.	Orchidectomy.	Seminoma.	Deep X rays.	4 yrs. 5 mths.
35	August, 1932.	1	"	"	Teratoma.	"	4 yrs. 8 mths.
			CURES, THREE YEARS AND OVER (1).				
29	Nov., 1930.	1	Nil.	Orchidectomy.	Seminoma.	X rays.	Not traced since 4/34. 3 yrs. 5 mths.

* Case 17. The original tumour was excised elsewhere, the present operation being for a scrotal recurrence.

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In the 14 cases dying from the disease, 8 had been irradiated. Amongst these the longest survival was Case 1, who lived 4 yrs. 1 mth. At the time of operation the inguinal glands were also involved and were excised. Subsequent to this he was never free from disease.

In the 15 patients in the five-year cure group, irradiation was used in 4 (Cases 8, 11, 18, and 22). Case 11 had an abdominal recurrence eight months after operation which was proved by section to be a seminoma. The patient remained well 9 yrs. 2 mths. after operation, and then died from an unknown cause. In the other 3 there was no definite evidence of metastases at the time of the irradiation.

The two survivors in the under-five-year group (Cases 32 and 35) both received prophylactic X ray treatment. In addition to these, Case 29, who is now untraced but remained well for 3 yrs. 5 mths., also received prophylactic X ray treatment.

It is generally recognised that testicular tumours should, on a priori grounds, be very radiosensitive. Clinical evidence in regard to the response of secondary growths to irradiation strongly supports this view. There is still considerable dispute as to the exact method of deep irradiation, but it seems probable that orchidectomy followed by irradiation should be carried out in all cases. The intensity of the irradiation and its distribution in time are matters that must be left to the radiotherapists themselves.

CONCLUSIONS

This paper concerns an unselected and consecutive series of 38 cases of malignant disease of the testicle from St. Bartholomew's Hospital, 1920–33, all of which were treated by means of orchidectomy and in some of which various forms of radiotherapy were also employed. The outstanding feature of this follow-up is the fact that in no fewer than 15 of the patients (46·9 per cent.) of a possible 32 was there a cure rate of five years or over.

These results show at least that a very high five-year cure rate has been obtained in a disease commonly regarded as almost uniformly fatal, and they may perhaps be of some encouragement to those who have any part in the treatment of patients with malignant disease of the testicle.

There is no doubt that the interval between the initial symptoms and treatment could be considerably reduced. As medical men, we cannot put the entire responsibility of this delay on the patient. Some of it at least is on our side. And in this matter, as in malignant disease in other situations, the doctor's awareness of the possibility of malignancy is likely to be more valuable than making malignant disease a bogy to the general public. The ability of the medical practitioner and the confidence in which he is held by his patient must be the outstanding features in the early recognition of any form of malignant disease.

No attempt has been made on the basis of the present series of cases to lay down any definite rules of treatment. Operation and irradiation may both be able to claim cures, but the number of good results obtained by a combination of these methods may well be greater than those obtained by either method alone.

Malignant disease of the testicle has become the dog with the bad name. I would suggest that, from the practical point of view, the time has come to review critically our attitude to this type of malignant disease.

My thanks are due to Mr. D. F. Ellison Nash for much of the preliminary work involved in the follow-up of the cases.

PSYCHOGENIC HEADACHE

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THE text-book descriptions of headaches occurring in the psychoneuroses are widely divergent. Thus Osler distinguishes between the headache of hysteria which is over the sagittal suture, and that of "neurasthenia" where there is a feeling of pressure in the occipital region. Other text-books mention other parts of the head as being affected, and one does not mention the occurrence of headache in hysteria at all.

Of 248 patients referred to the psychotherapist in the neurological department of the London Hospital, 52 had headaches as a prominent symptom. In another series of 165 patients, from whom compensation cases and those with mental defect and frank neuroses were excluded, 49 complained of serious head pain and 20 of milder discomfort. For the present review 75 patients from these two groups were selected, in whom pain in the head was a prominent though not always the only symptom, and in whom "mental disorder," so far as it can be separated from "psychoneurotic disorder," was excluded. These included 39 women and 36 men between the ages of 15 and 53 years, the majority being under 40. A full physical examination had not revealed any disease or defect.

A review of these cases shows that the characters of the pains complained of are so varied that it would seem better simply to state that a sensation of discomfort or pain in the head may accompany all neurotic conditions, and to abandon the assignment of a type of pain to any particular form of neurosis. Psychogenic cephalgia is indeed a good example of the way in which psychoneurotic symptoms may crop up in any form of neurosis, in the same way as in the frank psychoses a paranoid reaction is not confined to paranoia, but may show itself in any psychotic condition. Headaches are an exceedingly common accompaniment of worry in the non-neurotic, and the borderline between a headache of simple worry and the psychoneurotic condition is difficult to define. The headache due to worry should find more of a place in clinical teaching, for some of the chronic headaches included in this series almost certainly started in this way, and the patient's anxiety was stimulated by vague suggestions of more serious disease, when a frank statement that the cause was worry which could probably be surmounted might have led to enthusiasm instead of to fear.

It was found impossible to distinguish any special syndrome in connexion with a particular portion of the head or type of pain. In nearly half of the cases the terms used in describing the symptoms were not exaggerated and there was no evidence of excessive desire for effect. Although fantastic descriptions such as "a pain as if I was going to explode," "creeping feelings under the skin," "a sense of my head being pulled," "tickings," and so forth, are strongly presumptive of a psychogenic condition, the reverse is not true. The emotions caused by the pain often seemed well related to its persistence and disabling effects. To regard as functional only those headaches that are accompanied by gross signs of emotional instability or fantastic description seems clearly fallacious.

It was thought that in these patients there might be difficulty in differentiating between headaches due

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to constipation, menstruation, and sudden muscular exertion and those that were truly psychogenic. Actually constipation was uncommon and rarely seemed to cause headaches in these people, and they were able easily to separate the other types from those for which they sought advice. Where a headache was described without undue effect suspicion of a psychogenic origin was first aroused by its onset and disappearance. Thus a headache that occurs fairly regularly on Monday mornings or prevents the patient from doing anything at week-ends suggests a psychogenic and not a physical disorder.

The only division one could fairly make in the multitudinous descriptions of the pains was by distinguishing between those in which there was (*a*) an accompanying sense of pressure or heaviness, (*b*) a dull ache defying further description, and (*c*) a sense of throbbing or bursting. The first two types occurred in people with a passive attitude to their problems, their whole outlook being that environmental conditions could not be altered, when stronger personalities would undoubtedly have sought active readjustment. The patients who had headaches of the bursting type were individuals with more conscious ambitions which they could not realise, often because they were in fact unsuitable. Women predominated in the first two types, men in the third. In view of the oft-repeated statement that functional headaches are "like something driven into the skull," it is interesting that only seven patients used this description, and only four said that their pain was "like a band around the head."

ONSET AND COURSE

The onset of a psychogenic headache is frequently forgotten. The disabling symptoms complained of at the hospital stage are often the result of an evolutionary process which started in a headache of simple and, we may add, unexplained worry. Persistence in tracking the condition to its source is desirable if many neuroses are not to remain unexplained. Many patients will not give relevant facts until they realise that we are seriously going to pursue them.

Trauma was found to be an essential factor in two cases:—

In one, a woman, it had been assumed that the cephalgia was the result of a maxillary sinusitis, from which it had certainly dated, though the picture was not quite typical. When a fuller history was pressed for it was suddenly remembered that the pain resembled that of an injury sustained in a struggle with an offended relative. With the revival of this memory and a full discussion of the less savoury details of the quarrel the headaches were relieved.

Trauma acted in a very different way in a man of 40 whose unsatisfactory management of his life was likely to precipitate some neurotic symptoms, though actually he had had none until eight years previously, when he had concussion after being hit on the head by a cricket ball. Although he quickly recovered from the concussion, the pain persisted and was not amenable to medicine or suggestion in any form. It provided a point of fixation for his resentment and an excuse for his ill-managed life.

These two cases illustrate an important point in prognosis, the elasticity of the patient's personality. The first patient, in spite of serious personal problems, was prepared to remould herself; in the second any real adjustment would have endangered the attractive but tinsel-like façade which he presented to the world.

The symptoms may be either continuous or variable, those which are continuous being less amenable to psychotherapy. Those with continuous pain were people whose whole orientation to life had been faulty and often childish, and who had never really faced the problems of maturity. Though such rigid individuals may be difficult to cure, it is not true that they cannot be helped at all, for some have stated that psychiatric interviews have made their pain more bearable. Those cases where the pain comes and goes, or where there is a continuous dull ache with acuter exacerbations, show fairly constant features. In general they are people who have at some stage been psychologically mature and have then regressed. Because maturity has been achieved they are more coöperative, they can grasp the working of cause and effect, and their prognosis is better.

Thus one man had headaches of unbearable intensity that occurred both at home and at work and made social contacts difficult. Great relief followed his discovering that they depended not upon the attitude of others to him but upon his shouldering excessive burdens in his home and his business. His pride delighted in this but his nature revolted against it. Rather than admit the impossibility of his load he had relied upon his symptoms to relieve him of the necessity of completing his tasks.

This condition reminds one of examination staleness, in which anorexia and lack of energy accompany headaches which may be vague or serious. It would be interesting to know whether true staleness ever affects those whose ambitions are reasonable and not a reaction to unconscious inferiority. Such headaches may be described as headaches of simple worry, and whether they persist will depend upon (*a*) the severity and persistence of the precipitating cause, and (*b*) the flexibility or rigidity of the personality affected.

In some cases a full history shows that an apparently hysterical cephalgia, by which is meant a single symptom with no other neurotic signs, is an episode, long or short, in the evolution of a neurotic illness. The importance of this is that if the single symptom is considered its origin is often obscure, or the most important mechanisms of the conflict are overlooked. Often a past or present anxiety-state or obsessional condition is hidden by the obtrusive importunity of the headache. Thus in a woman a headache of 18 months' duration followed a three years' history of an anxiety state, the origin of which it was not difficult to find in her husband's development of epilepsy after marriage.

The effects that their headaches had upon the patients could be roughly separated into four types:—

Group I.—The pain was prominent but apparently did not disturb the individual's life. The "belle indifference" of the hysteric was clearly evident.

Group II.—The pain limited the patient's activities and therefore caused considerable concern. In some the sort of activities which were limited suggested the underlying motive for the symptom.

Group III.—The headaches produced an attitude of annoyance rather than indifference or limitation of activity. It is likely that such resentment was projected upon the symptom instead of upon a current or past source of irritation which could frequently be traced.

Group IV.—The headache was associated with a sense of dis-ease, sometimes described as depression, sometimes as causing tiredness and worry, or the fear of illness and death. None of these accompanying symptoms reached obsessional intensity, and their continuous character and associations distinguished them from melancholia.

CAUSATION

The problem of why the cranium is the site of the pain requires consideration. Palpitations and gastric

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disturbances in conditions of anxiety are referrable to the changes produced by emotion in the autonomic nervous system. If other physical symptoms of anxiety are attended by a physiological process giving rise to organ sensitivity, is such a process likely to be absent in cephalgias? According to Oppenheim cephalgia vasomotoria causes bursting headaches and anæmia those of the dull and heavy type. Despite the uncertainty that there is about the presence of vasomotor fibres round the intracranial vessels, the hypothesis that psychogenic cephalgia is associated with functional physical changes is more satisfying than hypotheses based upon such ideas as phallic symbolism. Once vascular changes have produced pain or discomfort apprehension is likely to cause these symptoms to continue. To forget the possibility of organic alterations is to encourage the canard that psychogenic pain is imaginary.

Previous trauma, as in all functional conditions, increases the liability of an organ to psychogenic symptoms, but only four of the present patients remembered any head injury.

The connexion in the lay mind between normal or abnormal mental function and the head seems to be a contributory cause of some people's symptoms. Neurotics as a whole are dimly aware that their minds are not working adequately. Some are acutely conscious of "lack of concentration" and others when pressed complain of preoccupation with images and ideas that they do not recognise as symptoms. They accept more readily than is often realised that all is not well with their mental outlook. On this basis some awareness of their heads stimulated by apprehension doubtless prolongs sensations which were at first produced by vasomotor change.

Mention must be made of the psycho-analytical statement that the head is a "well-known phallic symbol." The simpler proposition is to be preferred that to everyone, normal or abnormal, the head is a highly important part of the body, vying in this with the heart. Just as palpitations may excite the idea that the heart is seriously diseased and that life is endangered, so symptoms arising in the head, whether primarily caused by vasomotor changes or not, are a source of anxiety to the patient. Means of allaying this and the misconceptions connected with it are of first importance in preventing symptoms where the head is occupying too large a place in the individual's thoughts.

No consideration of psychogenic headaches would be complete without referring to the epinosic gain of the symptoms, for while this will not cause them it militates against their cure. By epinosic gain we mean the relief from stress that the patient obtains through the psychogenic symptom. It is the most serious barrier to emancipation from the symptom and, as we shall show later, it is an important consideration in prognosis. The epinosic gain may be seen when the symptom prevents the patient from facing difficulties, or affords a peg upon which repressed feelings of fear or resentment can be hung, as in the following cases:—

A man of 40 made successful attempts to gain promotion, but then found that this carried with it responsibilities that were a handicap rather than a relief. The onset of his symptoms coincided with rash attempts to compensate for his mistake. His pride prevented his accepting this, and the headaches saved his face.

Another suffered from headaches that he described as "being in the toils of hell," but he used precisely the same terms with regard to his employers in an absent-minded moment, and it was clear that the symptoms not only prevented his return to an environment which he regarded as unsatisfactory, but enabled him to express his real feelings about that environment in a roundabout way.

The neurotic symptom achieves an end—a paraplegia prevents a return to unwelcome duty, an agorophobia creates an invalidism and dependency upon others. A number of patients had themselves noted that their symptoms enabled them to escape from a difficulty, and others appreciated that there was such a connexion when it was explained to them. In these cases the commonest relief obtained was from distasteful work or society, from a new and obvious responsibility, or from some unpleasant train of thought. One patient could not face an engagement in his present state, another could not face professional training, and a third had to turn down an offer of new responsibility.

The relationship between cephalgia and the sexual life of the patient might seem a fruitful line of inquiry. In adolescents headaches sometimes follow masturbation, but none of the present cases were of this type alone. In some cases headaches followed normal intercourse and in others coitus interruptus, but often no headache followed either. No simple relationship between sexual life and symptoms could be found. The whole attitude of each individual to instinctual demands underlies the causation of the headache which follows or does not follow natural or unnatural stimulation of the sexual urge.

A formal description of particular types of pain in particular forms of neurosis seems to be impossible, but we can classify psychogenic headaches as follows:—

Type 1.—Headaches accompanying simple worry, readily recognised by patients as due to disquiet about current concerns.

Type 2.—Headaches incidental to anxiety states, in which cardiac, gastric, or other symptoms are prominent, depending upon: (*a*) the individual's personality; (*b*) severity of the precipitating cause and its associations; (*c*) the way the condition is dealt with; (*d*) the importance the patient attaches to his head. Where any one of these factors is unsatisfactory there is a likelihood that Type 3 will develop.

Type 3.—Chronic headaches, often of the pressure type, occurring especially in rigid individuals who show signs of emotional immaturity.

Type 4.—Headaches conforming to descriptions of hysterical pains, in that a single symptom is present without signs of anxiety or obsessional conditions, but in which a history reveals that the headache has been a substitute for these, or in which its disappearance is followed by the emergence of anxiety conditions.

Type 5.—True hysterical headaches, not preceded by other neurotic conditions.

PROGNOSIS AND TREATMENT

The prognosis of these cephalgias with out-patient treatment is partly explained by the factors (*a*), (*b*), (*c*), and (*d*) above, and by the suggested classification. The flexibility of the personality is the most important factor. The necessity for early and reasonable treatment in Types 1 and 2 is obvious. The prognosis in Type 3 is poor, since the patient is likely to have joined the ranks of professional sufferers, but gratifying results have followed attempts to make environmental adjustments. The work of the psychiatric social worker has been of much help here. In Type 4 the presence at some time of mental symptoms is an aid in approaching the patient and, though the prognosis is limited, a shift in symptoms

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from hysterical pain to anxiety state, or vice versa, appears to occur alongside insight and approachability. The examples of Type 5 did not do well, in response either to suggestion or persuasion.

Length of history appeared to be less important than might be expected. One patient whose symptoms had lasted for 17 years recovered and remained well. It was clear that the epinosic gain afforded by the symptoms was a hindrance to recovery, and in the out-patient class of patient a further complication was the solicitude and lack of understanding of the relatives. Where the latter could grasp the state of affairs the results were often encouraging. Treatment in an out-patient department consists in obtaining an adequate history, discussing environmental strains, and reviewing the patient's capacity for adjustment. Extensive psychotherapy is not possible, but much relief is often afforded by methods which many would consider far from ideal.

I wish to thank Dr. George Riddoch and Dr. Russell Brain who referred these cases to me and have permitted me to publish them.

TREATMENT OF SCHIZOPHRENIA BY INDUCED CONVULSIONS

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On a visit to Budapest I was so much impressed by the good results obtained by Dr. Ladislaus von Meduna in the treatment of schizophrenia that I decided to try his method on my return to India. The treatment originates in Meduna's idea that there is a biological antagonism between schizophrenia and epilepsy, and consists in the induction of epileptiform fits by giving large doses of the water-soluble synthetic camphor preparation, Cardiazol (Knoll). The dose of this useful drug required for inducing epileptiform fits is far in excess of the dose usually prescribed in clinical practice, yet it has no injurious effect on the normal heart.

Meduna starts the treatment by giving intravenous injections of 0·5 g. of cardiazol in a 10 per cent. watery solution. This dosage usually suffices to induce epileptiform fits in patients, and it is not increased if it continues to induce the desired convulsions. On the other hand, if it fails, the dose is increased to 1·0 g. in 10 per cent. solution (i.e., 1·0 g. in 10 c.cm. of distilled water). Some schizophrenics have shown full remissions with three or four injections, and others have not improved at all after twenty or thirty. Meduna suggests that no case should be given up as hopeless before twenty convulsive shocks have been induced. The treatment is contra-indicated in cases of organic heart disease or acute fever.

AUTHOR'S EXPERIENCE

The Ranchi Indian Mental Hospital is the largest and one of the most modern mental hospitals of India. For the purpose of this experiment I selected 12 typical cases of schizophrenia, most of which had failed to respond to several forms of treatment. On the first day they were given intravenous injections of cardiazol 0·5 g. in 10 per cent. solution, and each had typical epileptiform fits.

All the patients were males, and they were treated in a separate ward. A routine examination of heart, urine, and blood pressure was made on the day before each injection. On the day of treatment (Mondays and Fridays) a cup of hot milk was given at 6 A.M. followed by the injection at 10 A.M. No food or drink was allowed for at least seven hours after the fit.

A typical fit.—Immediately after the injection the patient's eyelids begin to quiver, the face becomes highly anæmic, the body stiffens, and the patient makes a few irregular movements of hands and feet. He then loses consciousness and a typical tonic stage sets in. The hands are clenched, the wrist and elbows are slightly flexed, the arms are held to the sides, and the legs are extended; the back and the face become cyanosed. The patient at this stage never fails to open his mouth for a few seconds and this is the time to insert an improvised tampon to prevent the patient from biting his tongue. The tampon is made 6 in. long and ¾ in. thick. Within a few seconds the clonic stage starts with irregular jerks and spasms. During this phase some patients pass urine and some ejaculate, with or without erection. At the end of the clonic stage the patient goes into a deep coma-like sleep which lasts for a few seconds. He then regains consciousness, but at first he appears to be confused and dazed and it is better to let him sleep and not to disturb him with questions. No one is allowed to leave the bed for at least 5–6 hours after the fit.

Variations in response.—The length of the tonic and clonic stages varied and we noted that patients with a strong prolonged clonic response eventually derived much benefit from the treatment. Two of the patients were always excited for a few hours after the injection, but at night they slept well without hypnotics; two others were hilarious for about half an hour. A katatonic, with marked flexibilitas cerea and mutism, on the day of the fifth injection implored us not to give him the treatment and said he would act and behave like a normal person in every way.

TWELVE CASES OF SCHIZOPHRENIA TREATED WITH CARDIAZOL (ALL MALES)

Ser. No.	Type.	Stay in hospital before treatment (years).	Injections.	Result.
1	Katatonic.	4	7 of 0·5 g. 13 „ 1·0 g.	Discharged as recovered.
2	Hebephrenic.	1	11 of 0·5 g.	Recovered. Resumed duties as clerk.
3	Katatonic.	1	8 of 0·5 g. 5 „ 1·0 g.	Discharged as recovered.
4	Hebephrenic.	½	8 of 0·5 g. 12 „ 1·0 g.	Much improved: fit for work.*
5	Katatonic.	1	7 of 0·5 g. 13 „ 1·0 g.	Much improved: fit for work.*
6	Hebephrenic.	4	11 of 0·5 g. 9 „ 1·0 g.	Much improved: fit for work.*
7	Katatonic.	4	9 of 0·5 g. 11 „ 1·0 g.	Much improved: fit for work.*
8	„	½	9 of 0·5 g. 11 „ 1·0 g.	No improvement.
9	„	½	9 of 0·5 g. 11 „ 1·0 g.	„ „
10	Paranoid.	11½	7 of 0·5 g. 13 „ 1·0 g.	„ „
11	Katatonic.	2	6 of 0·5 g. 14 „ 1·0 g.	„ „
12	„	6	10 of 0·5 g. 10 „ 1·0 g.	„ „

*This means that the patients were able to work in the occupational therapy departments of the hospital.

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I gave him a chance and he behaved very well for two days but relapsed on the third. The treatment was then continued and after a full course he showed great improvement in his katatonic condition.

Dangers and complications.—No case showed any dangerous symptom. One patient during a fit sustained a dislocation of the left shoulder which was soon put right and did not recur. It is said that any hypnotic, especially morphia, hyoscine, and paraldehyde, will counteract symptoms produced by cardiazol, but though these were always kept ready for immediate use we never had any occasion to use them.

The accompanying Table gives particulars of the cases.

SUMMARY AND CONCLUSIONS

Of 12 typical cases of schizophrenia treated with cardiazol according to Meduna's method 3 were discharged, showing full remissions, 4 were greatly improved and now lead a useful life in the hospital, practically attaining a "social remission," and 5 remained stationary. No dangerous symptoms developed, and the method has the advantage over insulin therapy that it does not require the same continuous care from doctors and nurses.

I am indebted to Messrs. A. G. Knoll for a supply of cardiazol powder.

A COMPARISON OF INSULIN AND CARDIAZOL CONVULSION THERAPIES IN THE TREATMENT OF SCHIZOPHRENIA

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Insulin treatment was established in 1933 by Sakel in Vienna, and Cardiazol convulsion treatment in 1934 by Meduna in Budapest. Insulin treatment was introduced into Great Britain early in 1936 by me, and cardiazol treatment a year later by L. C. Cook. Since both methods are finding increasing use in this country, a brief survey of their relative advantages and disadvantages, with respect to recent practical applications, may be useful.

Up to last May, when an international conference on insulin and cardiazol therapy was held in Switzerland, over 2000 patients had been treated with insulin hypoglycæmia all over the world, and over 600 with cardiazol convulsions, including a fair number in this country. The techniques of the two methods have been fully described by Isabel Wilson (1936) and Kennedy (1937), and only recent modifications, such as their combination, need be discussed here. Results are classified according to the four categories established by Müller (as set out by James, Freudenberg, and Cannon 1937)—namely, (1) complete remission, (2) incomplete remission, (3) partial remission, and (4) no improvement.

DEMANDS UPON TIME

An undoubted advantage of cardiazol treatment is the great saving of time; also its management is less exacting. Convulsions are induced two or three times a week, and as the whole process does not take more than five minutes of the doctor's time, he, with the aid of two or three nurses, can treat 40 to 50 patients in one morning. Insulin treatment is given six times a week, each treatment lasting about five hours from beginning to end, during which the doctor must not leave the patients. With the aid of two or three nurses, one doctor can treat 8–10 patients in one morning.

The after-treatment necessitates a similar amount of work with both methods, except that with insulin the nurses must be capable of dealing with after-shock, should it appear (Hamilton 1937). Both treatments should be accompanied by psycho-therapeutic encouragement and by occupation therapy. The duration of the whole course of treatment is roughly the same; cardiazol requires an average of 6–8 weeks and insulin 8–10 weeks.

ADJUSTABILITY TO CLINICAL REQUIREMENTS

Although the more lengthy and exacting procedure, insulin treatment has the advantage that it can be adjusted to any degree from mild hypoglycæmia to deep coma; cardiazol convulsions are not adjustable, and only the number induced is subject to control. Contrary to expectation, the biochemical changes produced by the two methods have much in common; the effects of cardiazol, however, are fully spent in a minute, whereas those of insulin extend over hours. Thus the element of shock does not predominate in insulin treatment; quite a number of patients recover without the necessity of reaching the coma stage, and the gradual mental "unfolding" which takes place during hypoglycæmia—layer by layer so to speak, as witnessed by lucidity and increasing insight—shows the unique therapeutic possibilities of insulin treatment.

Since the depth and duration of hypoglycæmia, and the time and method of terminating it, can be suited to clinical requirements, insulin affords a wide therapeutic range, and different techniques are in use according to the clinical type of schizophrenia (Sakel 1936).

MORTALITY-RATE, COMPLICATIONS, CONTRA-INDICATIONS

In the hands of the experienced, the mortality-rate of the two treatments is equally low. It was 1 per cent. among the first 700 insulin patients, and 0·5 per cent. among the first 600 cardiazol patients, but with accumulating experience it fell to 0·4 per cent. among 500 patients recently treated in Switzerland (Müller 1937). There is less likelihood of emergencies arising with cardiazol than with insulin hypoglycæmia, where laryngeal spasm, failure to awake from coma, or cardiovascular collapse may be encountered. Cardiazol is more unpleasant to the patients, but their apprehension can be alleviated by giving, 30–45 minutes before the injection, morphine sulph. gr. 3/8, hyoscine hydrobrom. gr. 3/200, and atropine sulph. gr. 1/100 (Cook 1938). I prefer premedication with insulin, referred to later, which completely eliminates unpleasantness.

The contra-indications—namely, any form of cardiovascular disease, as well as respiratory, renal, or hepatic disease—are the same for both treatments. So are their principal after-effects (occasional vomiting or transient attacks of tachycardia). Passing alterations of the T wave appear to be more common with insulin while with cardiazol luxation of the jaw or arm has been known to happen.

The fact that most patients gain weight while undergoing either form of treatment shows that there is no detrimental effect on their general health.

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The question whether or not hypoglycæmia and induced convulsions are as harmless to the brain as clinical observation suggests, remains an open one, but the results of recent animal experiments are reassuring in respect of hypoglycæmia (Schmid 1937) as well as of induced convulsions (Stender 1937).

PERMANENCE OF BENEFIT AND INCIDENCE OF RELAPSE

As regards permanence, treatment is too recent to admit of far-reaching deductions; however, a high proportion of the recoveries obtained in Vienna and Budapest four and three years ago, when treatment was begun, have been maintained. It is difficult to differentiate between the incidence of relapse of the two methods, for only one reference regarding cardiazol has been published. Angyal and Gyárfás (1936), treating 44 patients with cardiazol, obtained 17 complete or incomplete remissions and report 4 relapses (23 per cent.). With insulin Frostig (1937) treating 53 patients (27 complete remissions) had 4 relapses (15 per cent.). Béno (1937) treating 49 patients (35 complete, incomplete, or partial remissions) had 5 relapses (14 per cent.), while Müller, surveying 495 Swiss patients (200 complete or incomplete remissions), noticed 13 relapses, which is only 6·5 per cent.

It should be pointed out that with either method, poor results or relapses may be often due to the technical error of not giving a long enough course of treatment.

REACTION OF CLINICAL TYPES OF SCHIZOPHRENIA TO THE METHODS

The methods are not equally effective with all types of schizophrenia. Hebephrenia and dementia simplex both give relatively poor response to either method; in the other types the order of improvement with cardiazol is generally inversely that with insulin. For example, catatonic excitement and paranoid types are more responsive to insulin, whereas stupor responds better to cardiazol. This is of practical importance and shows the value of combining or of alternating the two methods, since patients proving refractory to cardiazol may readily respond to insulin and vice versa. Angyal and Gyárfás, by supplementing the treatment of those refractory to cardiazol by a period of insulin, found their remission-rate increased from 44 per cent. to 63 per cent.

COMBINED INSULIN-CARDIAZOL THERAPY

The method recently evolved by Georgi (1937) has the advantage that, for biochemical reasons, convulsions can be produced with a smaller dose of cardiazol (on the average 3 c.cm.), and, as the patient has no recollection of the process, the unpleasantness of the treatment is completely overcome. It should be clearly understood that cardiazol is given during the early stage of hypoglycæmia, well in advance of coma.

The technique is as follows. A full dose of insulin is given and coma would normally follow in 4–5 hours, but at the end of about 1½ hours, when the patient is somnolent, cardiazol is injected. After the fit, patients come round and are able to drink sugared tea, which terminates the hypoglycæmia. Insulin can either be given on six days of the week, convulsions being induced on the 2nd, 4th, and 6th days, or insulin (followed by cardiazol) is given on two or three days of the week only.

In my opinion this combination is particularly safe, because the early stage of hypoglycæmia employed is free from the possible complications of insulin therapy and the resulting increased susceptibility to convulsions reduces the dose of cardiazol.

SUITABILITY OF CASES FOR INDUCTION OF CONVULSIONS

Convulsions are a valuable adjunct during the ordinary course of insulin treatment, but they must not be indiscriminately induced. There have been instances of regression after them, but the contra-indications cannot as yet be formulated. Convulsions are indicated in cases which after a promising start show no further progress, and in stuporose patients generally.

Neither method is necessarily confined to the treatment of schizophrenia, both finding other psychiatric applications, and the calming effect of hypoglycæmia or of induced convulsions has been described as life-saving when used on acutely excited patients. Hypoglycæmia has been used in combating the withdrawal symptoms of drug addicts (Sakel 1933), and cardiazol convulsions to dispel or curtail the "psychic equivalents" of epilepsy (Baldauf 1937).

LIMITATIONS OF TREATMENT

The results obtainable with insulin and with cardiazol largely depend on the duration of illness. In the first year the proportion of complete and incomplete remissions is, with either method, about 60 per cent. (assuming an adequately long course of treatment with appropriate psychotherapeutic encouragement). This high proportion of recoveries, however, becomes rapidly less, with either method, as the duration of illness appreciably exceeds one year (see Tables I and II). For the second year, results are about half those of the first year, and for the third and subsequent years they are again progressively halved. This does not mean that it is unusual to obtain remissions in long-standing cases; Briner (1937) using cardiazol reports 9 per cent. complete or incomplete remissions in 54 cases of over five years' duration. It must be realised, however, that after a certain duration of illness good results can be expected only in a minority of cases, and early treatment is essential.

While convinced that insulin has the greater therapeutic possibilities, I would recommend that in long-standing cases the less expensive and time-consuming cardiazol therapy should first be tried.

SYNOPSIS OF RESULTS

Results reported with the two treatments are set out in Tables I and II. Table I may be regarded as representative of the results of insulin, since technique, diagnosis, and assessment are similar in all cases. In order to present a general survey of results with cardiazol, I had to group together the results of Meduna (110 patients), Briner (111), and of Angyal and Gyárfás (44). (Unfortunately, Meduna only distinguished between the remitted and the unimproved, and Angyal and Gyárfás's classification as to the duration of illness is not identical with the other two.) As long-standing cases predominate in Table II, the Tables are not strictly comparable, with the possible exception of the percentages in the last two columns, which do not show much variation of figures. Of especial importance, however, is the fact that the results of either treatment significantly surpass the average proportion of recoveries in untreated patients.

The insulin and cardiazol cases taken together (irrespective of their duration) show complete or incomplete remission in 40 per cent. and 37 per cent. respectively, whilst a general survey of spontaneous remission figures shows that of a total of 2460 patients, 23·6 per cent. were reported at home well or improved (Pullar Strecker 1938).

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An economic fact of great importance is that the average stay in hospital is much reduced both by insulin (Dussik 1936) and cardiazol treatment (Cook). Another observation is that recovery after these methods, as judged by insight and contact obtainable, is more complete than in spontaneous remission.

TABLE I—INSULIN TREATMENT

(after Müller)

Duration of illness in years.	No. of cases.	Complete and incomplete remission.	Complete, incomplete, and partial remission.	Unimproved.
		No. and per cent.	No. and per cent.	No. and per cent.
Under 1 ..	283	162 (57·2)	222 (78·4)	61 (21·6)
„ 2 ..	88	24 (27·3)	54 (61·4)	34 (38·6)
Over 2 ..	124	14 (11·3)	54 (43·5)	70 (56·5)
Total ..	495	200 (40·4)	330 (66·7)	165 (33·3)

TABLE II—CARDIAZOL CONVULSION TREATMENT

(after Meduna, Briner, and Angyal and Gyárfás)

Under 1 ..	103	71 (69·0)	82 (79·7)	21 (20·3)
1 to 5 ..	75	19 (25·4)	36 (48·0)	39 (52·0)
Over 5 ..	87	9 (10·3)	38 (43·5)	49 (56·5)
Total ..	265	99 (37·4)	156 (58·9)	109 (41·1)

CONCLUSION

The results obtained with insulin and cardiazol convulsions in the first years of illness show that they constitute a decided advance in the treatment of schizophrenia. It would be a mistake to neglect either method, or to practise one to the exclusion of the other. Both have their clinical indications and they can be selected according to the technical facilities available. A combination should be attempted wherever suitable, and their alternate use is recommended in refractory cases.

I wish to thank Prof. D. K. Henderson of the Edinburgh Royal Mental Hospital, where insulin treatment received its first trial in Great Britain, and the Medical Research Council, who supported this work by a grant.

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CLINICAL AND LABORATORY NOTES

THE ACTION OF TESTOSTERONE PROPIONATE ON THE UTERUS AND BREAST

BY ALFRED A. LOESER, M.D. Berlin, L.R.C.P. Edin.

BY experiments on female monkeys Zuckerman (1937) has shown that testosterone propionate can be used to inhibit the ripening of ovarian follicles. Cotte, Martin, and Mankiewicz (1937) have proved that it has a similar action in the rabbit. My own experiments with this hormone in gynæcological diseases began independently in April, 1937, and fourteen patients have so far been treated.

Five of these suffered from menorrhagia (10–14 days' loss at each period) probably caused by small intramural fibromyomas. Before treatment started a curettage was performed and the endometrium on histological examination was found to be in various stages of a normal menstrual cycle. In these five cases the curettage led to no change in the quantity or duration of the loss at the next period, and injections of testosterone propionate were accordingly commenced. Doses of 50 mg. intramuscularly were given on alternate days for two weeks and longer, and it was found that a total dosage of about 300 mg. postponed the period about 8–10 days. The menstrual flow was scantier and it lasted a shorter time. With doses totalling 500 mg. or more, menstruation was missed out altogether, and in a case thus treated curettage showed an endometrium that was completely atrophic. When treatment was continued the menstrual period did not return, and during this functional rest, in which the uterus received no stimulation by female hormones, the fibromyomas decreased in size. Clinical examination revealed a distinct shrinkage, though they never actually disappeared. When the injections were discontinued menstruation returned after 6–10 weeks.

Five other cases of menorrhagia, in which the cause was unknown, reacted to testosterone propionate in similar fashion. Small doses delayed the menstruation; larger total doses of 500 mg. or more brought about atrophy of the endometrium. One case of metrorrhagia deserves special mention.

Miss A, aged 30, had suffered for years from irregular menstruation, often of three weeks' duration. The uterus was soft but otherwise normal; the left ovary was distinctly enlarged. Curettage showed hyperplasia (Fig. 1). The next period had the same character as before and lasted twelve days. Injections of altogether 500 mg. testosterone propionate were then given within the next four weeks, and twenty-eight days after the last period curettage showed an atrophic endometrium (Fig. 2).

In all these ten patients I had to treat pathological menstrual hæmorrhages. The next two patients had normal periods but suffered from chronic mastitis. Turpault (1937) and Desmarest and Capitain (1937) report that this condition is favourably influenced by testosterone propionate, and my very limited experience agrees with theirs.

Miss B, aged 24, noticed a lump the size of a pigeon's egg in the left breast. Injections totalling 180 mg. of testosterone propionate were given and menstruation was inhibited. Six weeks after the last

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normal period a curettage was performed, and the endometrium was found to be in a premenstrual stage, corresponding to the third week of a normal cycle. Meanwhile the lump in the breast had decreased in size. Menstruation set in seven weeks after the last normal period. Further injections of testosterone propionate (600 mg.) were given, and four weeks after these injections curettage was again performed. The endometrium was atrophic and all the lumps in the breast had disappeared.

Generally, twelve injections of 50 mg. or six injections of 100 mg. were administered within three or four

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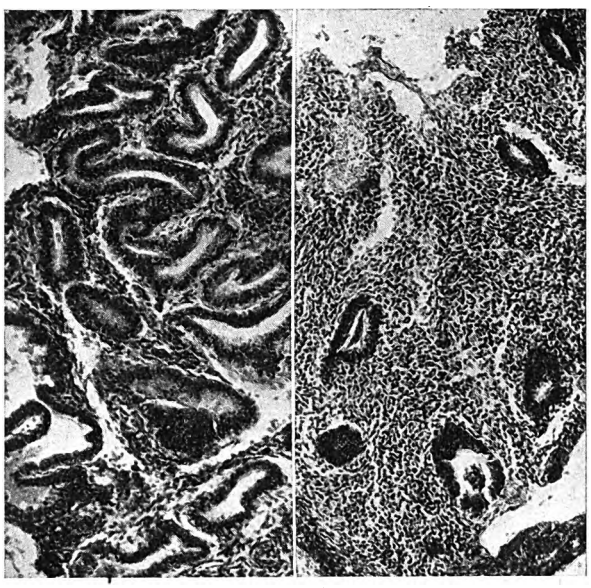

FIG. 1.—Endometrium from fundus of uterus before treatment showing hyperplasia.

FIG. 2.—Endometrium from fundus of uterus after total dose of 500 mg. of testosterone propionate.

weeks. No harm whatever was caused by these injections, even when given for seven months up to a total of 1500 mg.

In two cases of dysmenorrhœa excellent results were obtained after the injection of 150 mg. only.

CONCLUSIONS

Suitable doses of testosterone propionate can be used to induce atrophy of a normally functioning endometrium, or even of an endometrium in a pathological state resulting from stimulation by too much œstrin. This action could be explained by supposing that it prevents the ovarian follicle from ripening—perhaps by inhibiting the effective secretion of gonadotropic hormone by the anterior lobe of the pituitary gland. The results recorded suggest that it may be possible to direct and regulate ripening of the follicles by giving appropriate doses of testosterone propionate, and also that this substance will be useful in the treatment of chronic mastitis.

I am indebted to Dr. John Oliver of St. Thomas's Hospital for his histological examinations.

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CARCINOMA OF PANCREAS

WITH SECONDARY INVOLVEMENT OF LUNG SIMULATING ACUTE PLEURISY

BY JOHN MACKAY, M.D. Glasg., D.P.M.
ASSISTANT MEDICAL OFFICER AT THE COUNTY MENTAL HOSPITAL, WHITTINGHAM, LANCS

A MAN aged 69 had been an inmate of the County Mental Hospital, Whittingham, since 1901. He had maintained fair bodily health until August, 1937. At the end of that month he complained of a feeling of tiredness. He was put to bed but was allowed up on Sept. 5th.

On Sept. 27th he again complained of not feeling well. His temperature was 100·6° F. In a few days time there were definite signs of pleural effusion on the left side and the temperature remained elevated. Examination of the sputum was negative for tubercle bacillus, but pneumococci were found together with mixed organisms. On Oct. 11th cardiac embarrassment was so pronounced that it was decided to aspirate; 9 oz. of pleuritic fluid was removed. This was not blood-stained. His condition showed a little improvement and on Oct. 13th Prontosil treatment was begun. This was given in 15-grain doses thrice daily. The temperature gradually subsided and after Oct. 17th it remained normal or subnormal with the exception of a very occasional slight evening rise. During November improvement was maintained, although it was still possible to demonstrate the presence of fluid in the chest. About the middle of December a change was noted in the patient's condition. Signs of heart failure appeared and he gradually became weaker. He died on Dec. 20th.

Post-mortem examination.—The heart muscle was degenerated and the mitral and tricuspid valves were thickened. The aorta showed patches of atheroma. The right lung was congested. The left lung was also congested and the left pleural sac contained about 7 oz. of fluid. At the root of the left lung there was a new growth about 3 in. in all diameters. Despite the fact that it surrounded the vital structures entering the organ, it did not appear to have interfered with their function. The other organs showed no manifest disease with the exception of the pancreas which was the seat of an extensive primary growth. A few mesenteric glands were carcinomatous.

The case is interesting for the following reasons: (1) The onset of an "acute pleurisy" with elevation of temperature and subsequent defervescence and apparent improvement in the condition of the patient. (2) Despite the growth in the lung there were no pressure signs. (3) The primary neoplasm in the pancreas was unaccompanied by compression of the bile-duct, hence jaundice was absent. (4) The patient showed little or no emaciation.

I have to thank Dr. A. R. Grant, medical superintendent, for his interest in this case and for his permission to publish the details.

WEST LONDON HOSPITAL: RHEUMATISM CLINIC.—The new clinic formed for the treatment of chronic rheumatic diseases at this hospital was officially opened on Feb. 2nd, when a short lecture was given by Dr. W. S. C. Copeman, the physician-in-charge, who showed a film of his own making illustrating the differential diagnosis of rheumatoid and osteo-arthritis. He drew attention to the importance of chronic rheumatism as an industrial disease which cost the country more than any of the better known maladies, such as tuberculosis, upon which much public money is spent. He believed that the West London Hospital was the first general hospital in London, if not in the British Isles, to start a special department for the treatment and investigation of these diseases.

Other speakers included Dr. Maurice Shaw (dean of the medical school), Dr. James Fenton (medical officer of health for Kensington), Dr. J. B. Howell (medical officer of health for Hammersmith), and Lieut-Colonel J. E. McGwire (chairman of the Kensington public health committee).

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MEDICAL SOCIETIES

LIVERPOOL MEDICAL INSTITUTION

AT a meeting of this society held on Jan. 27th, with Dr. E. G. BARK, the president, in the chair, Mr. PHILIP HAWE read a paper on the

Treatment of Undescended Testis

He said that although in the past spontaneous late descent had been thought unlikely after the age of 3, recent statistics supported the view that in about four cases out of five the testis descended spontaneously by the age of puberty. A proportion of cases that otherwise require surgical treatment responded to injection therapy with gonadotropic hormones. This usually failed to secure descent, if there was an associated hernia and hydrocele, but a preliminary course of injections increased the size and vascularity of the testis and the development of the scrotum, and thereby improved the prospects of operation. Post-operatively also the hormones were of value. In bilateral cases injections should be begun at about the age of 6, except in the minor types. Unilateral cases should be considered individually. In those that needed operation he recommended the Ombrédanne and Thorek methods.

The PRESIDENT said that he considered many years must elapse before the dangers of over-stimulation by sexual hormones in growing children could be correctly assessed.

Mr. COSBIE ROSS discussed the results of endocrine therapy. He pointed out that the method had been used for a longer period in some American hospitals, and quoted Campbell as saying that while congestive enlargement of the testicle and full descent might occur as a result of a course of injections, in many cases the testicle had returned to its former site and had resumed its previous size a few months later. This appeared to indicate that hormone therapy should be used as an adjuvant to surgical measures, and he considered that the best time for operation was when hormone therapy had achieved its maximal effect. The importance of operative correction of bilateral cases had been emphasised by Moore's experiments in which the normal descended testicle of an animal was transplanted back into the abdomen and some time later was shown to have lost all spermatogenesis. This was due to the increased temperature in the abdomen and emphasised the important thermal function of the scrotum, which acted as a "testicular radiator." Mr. Ross considered that bilateral cases should be operated upon before the age of 8. Puberal changes were already in progress, and if the full physiological effect of the operation was to be obtained, it should be performed before these changes began. In unilateral cases he was prepared to wait until puberty. In conclusion, Mr. Ross said that the whole question of the treatment of undescended testicle was overshadowed by the hernia that was present in the majority, when neither endocrine therapy nor procrastination was justifiable.

Dr. JOHN D. HAY asked if the increased virilism and enlargement of genitals produced in some of the cases by injections of gonadotropic hormone persisted after the cessation of the injections.

Dr. A. G. C. FFOLLIOTT described two patients, the first a boy with a testis high up in the left inguinal canal that descended spontaneously at the age of 18, and the second a boy aged 7 with bilateral undescended testes high up in the inguinal canal, with severe symptoms of dystrophia adiposa genitalis, which responded to a course of gonadotropic injections twice weekly; the left testicle descended after the sixth injection, and the right after the tenth.

Mr. W. A. THOMPSON considered the treatment of undescended testes so important that it demanded closer observation and more careful recording by those who dealt with it in large numbers. He had seen over 400 patients, and had operated on 271. In his cases 1 in 9 were bilateral; 40 per cent. descended of their own accord, and this descent occurred during the first two years in 5 per cent., from 2–5 in 10 per cent., from 5–10 over 15 per cent., and from 10 onwards under 10 per cent. Hernia was found to be associated in only 35 per cent. It appeared that torsion was not seen so often now as formerly, possibly because these patients were under supervision and because pain in an undescended testicle is regarded as a partial torsion and an indication for operation. The presence of a hernia also called for surgery. His practice now was to operate at the age of 10, thus permitting a third of the cases to descend and in the others anticipating the physical and physiological changes of puberty. In over two-thirds there were uniformly good results clinically. In 10 per cent. the testicle had to be removed, and in another 10 per cent. the testicle atrophied. The remaining results could only be described as moderate. He had been disappointed and frightened at the results of hormone injections; they appeared to require serious consideration in relation to the future state of the patient.

Stillbirth and Neonatal Death

Mr. BRYAN WILLIAMS contributed some observations on a series of cases of stillbirth and neonatal death. He pointed out that the total loss of life from abortions, stillbirths, and neonatal deaths was enormous, and yet relatively slight attention was paid to it compared with that given to maternal mortality. In this country, however, several investigations had been made, starting with the classical and very valuable work of Spencer.

There seemed to be no object in separating the neonatal deaths that came under the observation of the obstetrician from stillbirths, since the same factors were responsible for both. Classification provided a difficulty, and no method was free from disadvantages, but he had endeavoured as far as possible to determine the primary cause of fœtal death. For this purpose, he had taken a series of 538 cases, which represented all the stillbirths and the great majority of the neonatal deaths that had occurred in Walton Hospital during 1936 and 1937. Post-mortem examination, for which his colleague Dr. R. Y. Dawbarn was responsible, had been carried out in 63 per cent. of these cases. Toxæmia was the biggest factor, and accounted for a quarter of all fœtal deaths. In patients with recurrent toxæmia, or in multigravidæ who developed a tendency to toxæmia after a series of normal pregnancies, the fœtal mortality was extremely high. Complications of labour provided a fifth of the deaths. Among these, cord complications were the most frequent. Cerebral hæmorrhage was also an important cause, and was found most often after normal delivery and least often after low forceps delivery, which was an extremely safe procedure from the point of view of the fœtus. Congenital abnormalities accounted for over an eighth, and of these, over a half were cases of hydrocephalus, anencephaly or spina bifida.

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Prematurity was the cause of death in a tenth of the cases, though this figure was higher in a general hospital admitting non-obstetrical complications of pregnancy and the puerperium than in a purely maternity hospital. Other conditions responsible included placental conditions, infections, multiple pregnancy, and hæmorrhagic disease. Syphilis at the present day seemed to be a rare cause of fœtal death, and was only found in 1 per cent. A few cases had been grouped under the heading of "low pregnancy threshold." In these, there was a considerable tendency in successive pregnancies for abortion, stillbirth or premature labour to occur without apparent cause. In reviewing these cases, there seemed very little that could be done in the light of present knowledge to reduce fœtal mortality appreciably. Improved standards in the conduct of labour could prevent some deaths, but it was mainly to the pædiatrician that they should look for help. The methods used to prevent infection in the mother during labour and the puerperium should also be applied in the case of the new-born, and an increased practice of breast-feeding would doubtless save many lives.

Dr. H. M. DUVALL showed a table summarising the causes of neonatal deaths and stillbirths occurring in the Liverpool Maternity Hospital in 1936, taken from the report. The total infant mortality-rate for 2094 births was 9·6 per cent., and the neonatal mortality-rate for 1947 live births was 2·8 per cent. Obstetrical difficulties and complications of labour accounted for 34·8 per cent., with toxæmias of pregnancy 26·6 per cent., gross fœtal malformation 12·8 per cent., no apparent maternal or fœtal cause (stillbirths only) 9·8 per cent., and chronic maternal disease, infections, prematurity, atelectasis, and asphyxia for the remaining 16 per cent. These figures showed a fairly close agreement with Mr. Williams's figures for Walton Hospital.

Miss R. NICHOLSON considered the great decrease of stillbirths due to syphilis, from the post-war figure of a third of all causes to the present low rate, was universal and due to the early and thorough treatment of pregnant women suffering from the disease. She thought that in toxæmic cases the lives of some infants might be saved by the artificial rupture of the membranes in patients who continued to have a high blood pressure in spite of treatment.

DEVON AND EXETER MEDICO-CHIRURGICAL SOCIETY

THE annual general meeting was held on Jan. 27th, with Dr. ROBERT SCOTT, the president, in the chair.

Radiology of Renal Tumours

Dr. HUMPHREY FOY discussed the rôle of radiology in the early diagnosis and treatment of hypernephroma and other renal tumours. Hypernephromata, now regarded as malignant adenomata originating from the renal tubules, typically arise from the upper pole of the kidney, immediately below the capsule. Thus a palpable loin tumour, though a cardinal physical sign, may be by no means an early one. Hæmaturia, another cardinal sign, does not occur until the tumour bursts its capsule and invades the kidney substance. Once the renal veins are invaded emboli are apt to follow quickly in the lungs and bones where metastases should as far as possible be radiologically excluded before operation is contemplated. The value of intravenous pyelography in these cases is not only to show abnormalities in the suspected kidney, but also to demonstrate the normality of the other kidney.

A man, aged 40, with a fortnight's history of transient pyrexia, hæmaturia and loin pain was found to have a vague mass in the right loin. A simple radiogram proved the swelling in the loin to be an enlarged right kidney. Intravenous pyelography showed that the enlargement chiefly affected the lower pole, that the upper and middle calyces and pelvis outlined satisfactorily but showed early dilatation, and that the lower calyx was missing. There was a pressure deformity along the lower border of the renal pelvis, and the part of the ureter in contact with the inner border of the kidney was also compressed by the expanding lower pole. The left kidney was perhaps slightly enlarged but otherwise normal. A diagnosis of hypernephroma was made, nephrectomy was performed by Mr. Wayland Smith, and the diagnosis was histologically confirmed by Dr. W. A. Robb.

Fifty per cent. or more of hypernephromata when first seen are too large to be operable, but being sensitive to irradiation may be so reduced in size as to be made operable. Post-operative irradiation also, in the hope of sterilising the surrounding tissues, is a therapeutic measure which should not be neglected.

In the ensuing discussion Mr. ALAN GAIRDNER said that intravenous should always be supplemented by retrograde pyelography, for thus only could obstruction in the calyces be satisfactorily demonstrated. By relying solely upon the intravenous method a false impression might be gained because the calyces do not fill and empty simultaneously.

SOUTHERN MEDICAL SOCIETY, GLASGOW

AT a meeting of this society on Jan. 27th Dr. JAMES F. BRAILSFORD (Birmingham) read a paper on

Paget's Disease of Bone

The clinical picture drawn by Paget in 1876 was, he said, so complete that though numerous observers had seen many more cases their descriptions added little. Dr. Brailsford gave the following analysis of the findings in 154 patients (82 males and 72 females) he had examined :—

Age Periods

20–30	30–40	40–50	50–60	60–70	70–80	80+
1	5	24	53	53	13	5

Youngest 27. Oldest 87.

Site First Discovered

Pelvis.	Tibia.	Femur.	Head.	Spine.	Humerus.	Os calcis.
58	37	22	13	13	8	3

Fractures

Tibia.	Femur.	Humerus.	Pelvis.	
7	8	5	3	Total 23

Malignant Changes

Pelvis.	Tibia.	Femur.	Scapula.	Spine.	
2	1	1	1	1	Total 6

The majority had no distinctive clinical features: the condition was discovered accidentally during radiographic examination of the spine or pelvis of patients who complained of pain or discomfort or who were suffering from a spontaneous fracture. Only patients with a bowed tibia were suspected clinically of suffering from the disease, and when the skeleton of these was radiographed other isolated bones showed further evidence. The affected bone is expanded and plastic, and the lesions fall into three groups: (1) those showing decalcification, (2) those

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showing a general increase in density, and (3) those showing fusion and increased density and thickness of the peripheral and main trabeculæ in which lanceolate, ovoid, or rounded areas resembling bone cysts are apparent. The disease seems to begin either in the endosteal or periosteal tissue. When it begins in the latter the periosteum appears to be stripped from the bone by a deposit of osteoid tissue between it and the cortex. Only in that segment of the bone from which the periosteum has been stripped does decalcification and absorption of the original shaft occur; therefore the bone with intact periosteum has normal outlines, density, and structure. There is a clear V-shaped line of demarcation between the shaft of the normal and the diseased bone. In the acute phase with decalcification spontaneous fracture is common; later calcium is deposited and the tendency to fracture, though present, is much reduced. The fractures heal readily. Malignant metaplasia may occur after as short a period as 3–4 years or as long a period as 30–40 years. This complication readily becomes apparent clinically and radiograms indicate either a tumour of the periosteal tissue, with little or no change in the bone, or an endosteal lesion. Metastases appear in similar sites rather than in the viscera.

The following lesions, said Dr. Brailsford, have radiographic features resembling those of Paget's disease: (*a*) carcinomatous infiltration of the bones from a primary in the prostate, stomach, or œsophagus; (*b*) chronic fluoride poisoning; (*c*) marble bones (Albers-Schönberg disease); (*d*) angioma; (*e*) chronic inflammatory processes; and (*f*) Ewing's tumour.

ROYAL SOCIETY OF MEDICINE

SECTION OF SURGERY

AT a meeting of this section on Feb. 2nd, with Prof. G. GREY TURNER, the president, in the chair, a discussion was held on the treatment of

Acute Streptococcal Infections

Dr. S. C. DYKE (Wolverhampton) said that as infections by non-hæmolytic streptococci were but rarely acute and their treatment had altered little in the last century, he would speak only of the hæmolytic organisms. Until two years ago infection by them had been one of the most dreaded and dangerous of ills and treatment had resolved itself principally into the time-honoured measures of rest and heat; these two remained as important to-day, although the introduction of the sulphanilamide group of drugs had completely altered the outlook. The discovery of these compounds might be claimed as a triumph for scientific method in so far as it resulted from chemotherapeutic research. The original investigator, Domagk, had put a red dye on the market for its antibacterial action and it had remained for the Tréfouëls in France and G. A. H. Buttle in England and their co-workers to show that a particular component of the dye was effective. The statistics produced by L. Colebrook and his co-workers at Queen Charlotte's Hospital left no doubt of the effectiveness of the sulphanilamide compounds in the treatment of puerperal sepsis. There were, however, no comparable data for its effect in the treatment of cellulitis, lymphangitis, and other acute infections usually regarded as surgical. This was probably because in nearly every hospital the laboratory service was ancillary to, rather than an integral part of, clinical work. Nevertheless the efficacy of these drugs in infections other than puerperal fever was also undoubted.

Although sulphanilamide was only sparingly soluble in water it was quickly absorbed from the intestinal tract. It was apparently as effective when given by the mouth as when given by injection, and it should therefore be swallowed except when some reason like persistent vomiting made that impossible. To taste it was to understand the phrase "dust and ashes in the mouth," but this seemed a minor inconvenience when an American experience of attempts to make a palatable liquid preparation was borne in mind.

The first untoward symptom which had been noted after taking sulphanilamide was the formation of sulphæmoglobinæmia and methæmoglobinæmia with the rapid development of a blue look. The peculiar thing was that the patient's general condition was usually not affected for the worse unless he was already anæmic; then the extra withdrawal of hæmoglobin from circulation might lead to sighing respiration and breathlessness. This was relieved by a small transfusion. Pyrexia was also known to occur 7–10 days after the first administration of the drug and was sometimes accompanied by a rash; this was readily distinguished from measles as it was more like measles than any measles rash. The nausea that some patients experienced after each dose was not an indication for cessation of treatment. Dr. Dyke thought that the drug's toxicity to tissues had been exaggerated and that there was little evidence that it should be withheld on account of renal or hepatic insufficiency. On the other hand he believed that the doses often used were unnecessarily large. He gave 4 grammes on the first day of treatment and 3 g. on succeeding days for a week; the aim was to sway the fight in the favour of the host rather than to kill every organism. The action of the drug was enhanced by the presence of leucocytes and it was useless as a local antiseptic. If after ten days of suitable treatment with sulphanilamide the temperature was still raised, pus was probably localised, and the time had then come to call in the surgeon.

Mr. P. H. MITCHINER thought that if the surgeon were only called in after ten days the diagnosis might be reached after death. The first essential in treatment was complete local and general rest. Where pain prevented rest a judicious incision was justified for its relief. The liberation of fluids and efficient splinting might be necessary and he thought adequate openings rather than mere nicks were required. The second line in treatment was keeping up the fluid intake by drinks and subcutaneous saline. He had not been favourably impressed by the effects of blood transfusion and thought that the use of donors' blood was not justified where saline was at least as effective. Intravenous saline had to be given slowly to these cases for fear of producing œdema of the lungs. The judicious use of alcohol especially as spirits was distinctly beneficial. His practice had been to give Prontosil album to all bad septic cases starting with two tablets of 3 g. by mouth on the first day. The drug might be given up on the third day if the pulse-rate had not dropped, for the infection could then be assumed not to be due to hæmolytic streptococci; by that time the pathologist's report might be through. If there were a response to the drug one tablet was given daily until the pulse-rate and temperature were normal, usually in eight days. Prontosil was given even when staphylococcal infection

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was suspected, to obtain the benefit of any doubt. His experience was that the drug was of little use in erysipelas either in checking spread or preventing relapses, but he was informed by the house surgeon of the septic wards at St. Thomas's Hospital that since prontosil had been adopted relapses had ceased altogether. Previously relapses had occurred in 40 per cent. of the cases. The spread of the rash seemed to be checked and the temperature came down in 8–10 days. These, he thought, must be recognised as beneficial results. Localised cellulitis did not improve without surgery.

Mr. T. B. LAYTON said that complete reliance on sulphonamides in all types of streptococcal infection would be a very serious matter. He thought the drug should be described as one which would help a small number of patients who could not be helped before. Surgical treatment by opening and removal of fluids still remained good. The middle-ear cleft seemed to be a special test-tube for the culture of streptococci, which were found there sometimes even after staphylococcal infection of the pharynx. Prontosil should be given when cases were too advanced for surgical treatment, but he doubted whether it was effective or specific. It might possibly mask symptoms without touching localised disease, removing streptococci from the blood, and leaving the infection in the middle ear.,

Dr. MEAVE KENNY thought the first aim in treating puerperal infection was the saving of the patient's life. Quite often patients went out from hospital discharging freely but otherwise in good health. With only surgical means 99–100 per cent. of cases of puerperal peritonitis died. In pelvic cellulitis prontosil was apparently not so successful, but it checked both occurrence and spread, and it had also reduced the average stay in hospital.

Prof. J. B. CLELAND (Adelaide) asked whether prontosil should be started immediately after a finger had been pricked at a post-mortem or be delayed until infection had been contracted. He had seen a case of a girl with a streptococcal infection near the mouth in which the organism was recovered from the blood, and in which prontosil was administered. Agranulocytosis was discovered, the blood culture was then found to be sterile, and the patient died with a sloughing pharyngitis. At post-mortem a staphylococcal pneumonia was found; in the spleen chains of streptococci were found in an infarct, but none in the living tissue. It looked as though the streptococci had survived in the dead tissue and invaded the body when the drug was no longer being given.

Dr. CUTHBERT DUKES said that it was often possible to get a report on a blood culture in 24 hours. Three cubic centimetres of blood were sufficient for culture and sometimes the organisms were so numerous that they could be seen in a direct film.

Prof. J. PATERSON ROSS thought renal infection was often a serious complication of streptococcal infection. An incision was not always necessary for the relief of pain as elevation and the application of hypertonic saline were effective.

Mr. E. C. B. BUTLER said that at the London Hospital the dose given to adults was two tablets of 15 grains every eight hours; after four days the dosage was lessened. Intramuscular injection of sulphanilamide was painful and afterwards toxic effects were commoner and absorption was no quicker. A white cell count was done as a routine. Cyanosis had been in evidence in every case. Beneficial results had been obtained except where the infection was localised. The sulphonamide drugs were not a panacea and those who used them should be aware that toxic effects occurred.

Mr. J. P. HOSFORD asked what Mr. Mitchiner did when he pricked his finger at an operation.—Mr. CHARLES DONALD suggested the dictum that where there wasn't pus it shouldn't be let out. The fluid poured out in acute infections might be beneficial. About 95 per cent. of cases of lymphangitis subsided in 48 hours spontaneously.—Dr. G. A. H. BUTTLE said that the sulphonamide drugs were generally ineffectual clinically against staphylococcal infections, although they acted in mice.

The PRESIDENT considered that pain at an early stage of infection was a fair indication that an infection was streptococcal. He thought some infections—say after street accidents—could be prevented by the use of antiseptics; too much reliance was put on aseptic methods nowadays. When he pricked his finger at an operation he finished the operation, squeezed his finger and sucked it until he was tired of doing so; then he forgot about it. Inability to take food was a bad prognostic sign in infective cases. He welcomed the inclusion of rest in treatment; so many cases in war-time had been allowed to get up early and had died suddenly later.

Dr. DYKE, in reply, said that at present the evidence suggested that sulphanilamide should be taken before infection was established in a prick. He had seen hardly any cyanosis since all purgatives except paraffin had been forbidden.

Mr. MITCHINER said that when he pricked his finger during an operation he finished that first, usually winding a catheter round the finger for the time being to produce congestion. Then he sucked the finger and forgot about it; he was sure that was important.

SECTION OF PSYCHIATRY

AT a meeting of this section held on Feb. 8th the chair was taken by Dr. J. S. GOODALL, the president, and Dr. G. W. B. JAMES read a paper by himself, Dr. RUDOLF FREUDENBERG, and Dr. A. TANDY CANNON on a year's experience of

Insulin Therapy in Schizophrenia

The method, he said, had been in use at Moorcroft House, Hillingdon, since Jan. 1st, 1937, and 24 cases had been completed. The technique described last May[1] had not required any essential modification. He showed a film illustrating it, and advocated disuse of the word "shock" which exaggerated the dangers. A mortality-rate of 0·5 per cent. had been reported from Swiss hospitals, and probably this could be still further reduced by improvement and standardisation of technique. Emergencies arose with dramatic suddenness, however, and there must be no relaxation in vigilance or lack of essential appliances, if fatalities were to be avoided. Two serious emergencies had occurred in the year under review. The first was in a paranoid schizophrenic male of thin asthenic type with a history of cardiac collapses; he had had an epileptiform attack during his twenty-ninth coma, followed by pulselessness and venous collapse. Intracardiac glucose and subcutaneous adrenaline had restored him at once, but treatment had been discontinued. The second was in a paranoid schizophrenic aged 24, in excellent physical condition. During his thirtieth coma he had remained asleep and had become flushed and restless with extensor plantar responses. For three subsequent

[1] *Lancet*, 1937, 1, 1101.

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days he had suffered from headache, vomiting, and somnolence, but had ultimately recovered both physically and mentally. Prolonged deep coma might be necessary in certain cases, but introduced an added risk. Among 1628 patient-insulin days there had been 18 cases of late hypoglycæmia, all due to insufficient meals or vomiting. There had been no urticaria at all.

It was not easy to be precise about dosage; the aim was to achieve coma in the third hour of hypoglycæmia. Coma had been produced in one patient by 15 units and in another had required over 400 units. Sensitivity to insulin seemed to vary in the same patient during treatment. Blood-sugar estimations showed a fairly constant series of changes: a fall to 30 mg. per 100 c.cm., and a rise to a little below normal half an hour after interruption. In selected cases Cardiazol was given as well as insulin, because there seemed to be added benefit from the epileptiform attacks which it induced. The daily coma period must be extended gradually and should never be longer than an hour and a half. The hypoglycæmia was usually interrupted by giving weak sweet tea through a nasal tube. Epileptiform attacks were no longer regarded as an emergency, and the passage of the tube was delayed until their conclusion. Intravenous interruption had been necessary 106 times, owing to spasm, vomiting, cardiovascular reasons, twitchings, and failure to arouse half an hour after a tube feed.

Results should be classified strictly. Four groups were suggested. "Complete remission" represented disappearance of schizophrenic symptoms, normal affective relationship, full insight, and ability to return to normal work. "Incomplete remission" included return to work with persistence of one psychic symptom. "Partial remission" meant return to work with more than one symptom. The fourth class were "unimproved" and required hospital care. In the year now reviewed 10 cases with less than eighteen months' history had been treated, and 9 of these had resumed their former occupations. Of 14 long-standing cases treated, 2 had returned home and a third awaited discharge. All 3 of these had previously shown a tendency to remission. Some other old cases showed clinical improvement. The longest period of treatment was 118 days, the shortest 26 days, and the average 68. The average total in-patient period was 78 days. At least 60 insulin days should be tried before abandoning treatment as unsuccessful. The amount of insulin used was about the same in the recent and long-standing groups respectively; the number of insulin fits per 100 insulin days was 1·67 in the recent group and 6·54 in the old-standing group.

A further 94 cases collected by the British Psychiatric Insulin Society brought the total of cases to 118. Of these, 22 were of less than six months' history and 19 showed complete remissions; of 18 cases with from six to twelve months' history, 15 had recovered; of 9 cases between twelve and eighteen months, 5 had recovered; and 22 of 69 cases of longer standing than eighteen months. The joint percentage of complete and social remissions worked out at 51·7, which agreed with the Swiss figure of 52·5 per cent. given by M. Muller. These figures were well ahead of those for spontaneous remission; it remained to be seen how durable they would prove.

Dr. MURDO MACKENZIE thought there was a parallel between pyrotherapy and insulin treatment, but the comparison broke down early because general paralysis was a killing disease and its laboratory diagnosis was a matter of precision. The schizophrenic group were not like this, and experience alone could justify a new and drastic treatment. Great caution was necessary in applying it to recoverable adolescent emotional disturbances. Doctors and parents wanted to know whether insulin therapy was primarily for the acute and recoverable or whether old, chronic cases were also suitable.

Dr. H. PULLAR STRECKER thought insulin therapy should take its place as the most hopeful treatment of schizophrenia available. The early percentages of complete remissions in early cases were very encouraging. About 3000 cases had since been treated in different countries, and the figures of recovery had gone down. This was all to the good; a sound treatment like insulin therapy was not out to create records. Even if the figures were not higher than those for spontaneous remission, it would not matter, for insulin remissions could be obtained when required and their quality was better than those of natural recovery.

Dr. E. H. LARKIN agreed that insulin remissions were better than spontaneous ones. Treatment should be given to every case, just as appendicectomy was performed for appendicitis. It was not worth delaying, because spontaneous remission might never occur and long-standing cases, even when returned home, were little affected.

Dr. MILDRED CREAK asked the age of the youngest patient and whether insulin should be used for the severe brief psychotic attack of adolescence.

Dr. DONALD BLAIR thought that the relative merits of cardiazol and insulin should be carefully considered, since the former was a relatively simple treatment while the latter really demanded a specialist insulin officer.

Dr. HENRY YELLOWLEES said that duration of illness was open to immense variation of individual opinion.

The PRESIDENT said it had been shown that there was a lowered rate of oxygenation in schizophrenia,[2] that stupor catatonia could be benefited by hyperoxygenation, that toxins and amines reduced brain cell oxidation, and that the effect of cardiazol on the brain cell oxygen should be ascertained.

Dr. JAMES, in reply, said they had no experience of cardiazol alone; it was a rather terrifying experience if the patient were not first made sleepy with insulin. A combined use would perhaps prove a better method than either alone. The problem of duration of symptoms had been tackled by seeing two relatives and trying to arrive at the date at which some member of the family had first noticed the patient was queer. The youngest patient had been a girl of 19 with eight months' history; she had been well nearly a year. The treatment was empirical, as Dr. Mackenzie had said. Agreement was needed on the diagnosis of schizophrenia and the selection of cases for treatment. Insulin therapy was well worth trying up to two years and gave results nothing else could give. After five years they became less and less satisfactory, unless there had been a natural remission.

[2] See *Lancet*, Jan. 22nd, 1938, p. 210.

INSTITUTE OF BRITISH SURGICAL TECHNICIANS.—Mr. N. St. John Dudley Buxton, F.R.C.S., will give a lecture to this institute on Friday, Feb. 18th, at 8.15 P.M., at the Welbeck Hotel, Welbeck-street, London, on modern treatment of fractures. Tickets may be had by members of the medical profession, from the secretary of the institute, 6, Holborn Viaduct, London, E.C.1.

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LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION

ON Jan. 27th Dr. MEAVE KENNY addressed this association on the use of

Sulphanilamide in Obstetrics

She said that infection by the hæmolytic streptococcus is estimated to cause 1500 deaths among puerperal women each year in England and Wales, and in addition some 6000 or 7000 suffer serious illness from this cause. Though it is hoped that the majority of the deaths can be prevented with sulphanilamide these infections remain a disgrace to obstetrics. They are avoidable by an improvement in obstetrical technique, which nowadays must be understood to include the thorough grasp and conscientious application of rules for the antiseptic and aseptic conduct of labour and the puerperium. The measures advocated by Dr. Leonard Colebrook in his many publications on the prevention of puerperal sepsis are scientifically sound, simple, and practicable in all circumstances.

Many disabilities follow non-fatal sepsis and Dr. Kenny had found that sterility is a common remote effect (*Lancet*, 1937, **1**, 14). This in itself, she said, shows how much better it is to prevent the disease than to cure it. Relaxation of any part of the ritual for the prevention of infection, and reliance on the curative properties of sulphanilamide, may spell disaster. Laboratory and clinical trials of this drug at Queen Charlotte's Maternity Hospital Isolation Block have fully justified all claims made for it as a remedy for hæmolytic streptococcal infections, but though there is experimental evidence that it has some value as a prophylactic, its effects have been insufficiently studied clinically. Its use in this field is justified where a woman has been exposed to a known or suspected risk of hæmolytic streptococcal infection, or after operative delivery while awaiting the bacteriologist's report on a vaginal swab. Bacteriological investigation for every case of puerperal pyrexia cannot be too strongly advocated, both to enable the obstetrician to initiate or justify sulphanilamide therapy, and to avoid the conveying of infection to other parturient women, by early recognition of the necessity of isolation. The "compleat" obstetrician should not require legal stimulus to carry out this essential preliminary to the proper treatment of puerperal sepsis.

In other bacterial infections encountered in obstetrical practice sulphanilamide may also be useful—notably in the urinary infections of pregnancy associated with *Bacterium coli*. Here sulphanilamide appears to offer a reliable, simple, and rapid remedy, well tolerated even by the febrile pregnant woman who is intolerant of other therapy. In the majority of cases the symptoms disappeared and the urine became sterile in a far shorter time than with other urinary antiseptics. With the small doses given by the speaker and her colleagues at the British Postgraduate Medical School toxic effects were negligible (*Lancet*, 1937, **2**, 119).

The only remaining use of this drug as it affects the obstetrician is in the treatment of gonorrhœa. Dr. Kenny said that her experience here was too slight for her to offer any opinion except to plead for very careful laboratory and clinical trial before raising public hopes of a swiftly acting remedy. Neglect of this precaution may well lead to an increased spread of the disease by patients who are clinically relieved but bacterially active.

ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS

THE quarterly meeting of this association was held on Jan. 28th, Dr. L. P. LOCKHART presiding. In a paper on

The Health of the Coal-miner

Dr. S. W. FISHER (H.M. Medical Inspector of Mines) discussed in general terms the problems of the modern coal-mine in relation to health, from the viewpoint both of environment and specific hazards. The average number of persons employed in the coal-mining industry during 1936 was 767,100, about 2400 less than in 1935 and nearly 190,000 less than in 1929. Of these workers the great majority were subjected in some form or other to factors that tended to produce incapacity for work. Among the specific diseases to which the miner might be liable Dr. Fisher mentioned in some detail silicosis, nystagmus, beat hand, elbow, and knee, and infective jaundice. He outlined present-day theories of causation and pathology of silicosis and showed how important it was as a cause of serious disability for work in miners, particularly in South Wales. He showed how modern methods of lighting in mines were definitely preventing miners' nystagmus, and demonstrated the different types of lamp in use by miners in the past and to-day. Illumination in mines was intimately associated with safety and he welcomed the fact that during the past few years the number of electric cap lamps used by miners had greatly increased at the expense of hand lamps. After discussing in considerable detail the causation and prevention of accidents in mines and demonstrating various types of rescue apparatus, Dr. Fisher turned to the question of carbon monoxide poisoning. He mentioned in particular the delayed action that had caused so many fatalities in mine disasters. It was vitally important to use an oxygen and carbon dioxide apparatus to expel the residual gas from the body. It was valuable not only in gassing cases but also in the treatment of shock after any serious injury.

Dr. A. J. AMOR (Mond Nickel Company, Limited), giving a practical demonstration of the value of radiology in the diagnosis and prognosis of silicosis, said the problem was one of tremendous social significance. Incapacity for work as a result of injury or disease had caused some of the most tragic conditions in the miner's home. The eventual disablement produced repercussions on the whole economic structure of the community.

Dr. C. L. SUTHERLAND (Silicosis Board), Dr. A. MEIKLEJOHN (Silicosis Board), and Dr. E. R. A. MEREWETHER (H.M. Medical Inspector of Factories) also showed X rays of the thorax with reference to the difficulties of differential diagnosis and the estimating of degrees of disablement. They produced evidence to show that silicates may set up changes in the lung suggestive of some form of pneumoconiosis. It was likely that these changes were not producing an incapacitating disease.

Captain HAY (Mines Department) was present by invitation and demonstrated modern mechanical methods of dust prevention in mines, particularly at the cutting face.

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REVIEWS AND NOTICES OF BOOKS

Biological Standardisation of the Vitamins

By KATHARINE H. COWARD, D.Sc., Reader in Biochemistry, University of London; Head of Nutrition Department, Pharmaceutical Society of Great Britain. London: Baillière, Tindall, and Cox. 1938. Pp. 228. 12*s.* 6*d.*

Dr. Coward has given us a unique and indispensable book. Others have written on the biological estimation of the vitamins, but no one else has attempted to expound the underlying principles of biological standardisation. There are common features underlying all methods of biological standardisation, but some of these are exaggerated in the case of the vitamins. Biological estimation of values has to depend on measurement of the magnitude of animal response, and the individual response to the same size of stimulus varies enormously in stocks of animals in different places or in the same stock in the same place at different times or even at the same time. To overcome this great inherent difficulty the international standard substances and their units have been set up. Their proper use and application demand the strict observance of certain very important precautions. With these Dr. Coward deals in what may be called the mandatory parts of her book.

She also describes the various methods of testing for each vitamin which she has found satisfactory in her laboratory; but, as she continually points out, other workers may have devised different but equally good methods of their own. These are the permissive parts of the book. Only four vitamins are dealt with—A, B_1, C, and D—since these are the only four for which international units and standards have so far been set up, and for which, therefore, reasonably quantitative biological estimation can be expected. One chapter, devoted to "the interdependence of the vitamins," shows how insufficiency of one vitamin may limit the response to administration of another, particularly when the response is by growth. We should have preferred to define this concept "vitamins as limiting factors," but the criticism is a small one and the critic falls silent as the general feeling of profound thankfulness for the book prevails.

The second part of the book is devoted to the statistical estimation of the accuracy to be expected from results of experiments when carried out as laid down in the first part. Dr. Coward says in the preface that this part of the book is written "in the hope that even students who are not mathematically inclined will nevertheless read it and decide that the statistical treatment of results is very simple after all." While adding to the value of the book, this part is held sufficiently in the background for the statistically timid not to be deterred from using the first part.

As an appendix is reprinted the report of the second international conference on vitamin standardisation held in 1934. Nothing in fact is omitted which could enhance the usefulness of this work. If only it could be translated into the languages of all those who make biological estimations for vitamins, and be read and applied by them, the world might be supplied with the reliable series of uniform values for the vitamin content of foodstuffs so sorely needed for compiling the vitamin values of diets as scheduled by modern dietary surveys. As it is, chaos prevails.

The 1937 Year Book of Eye, Ear, Nose, and Throat

By E. V. L. BROWN, LOUIS BOTHMAN, GEORGE E. SHAMBAUGH, ELMER W. HAGENS, and GEORGE E. SHAMBAUGH, Jun. Chicago: Year Book Publishers; London: H. K. Lewis and Co. 1937. Pp. 640. 10*s.* 6*d.*

WE welcome the 1937 number of this excellent publication from the hands of the same five teachers in the University of Chicago who have been responsible for it during a number of years. It consists, as before, of a vast number of abstracts from the current literature of the specialties mentioned, carefully selected and well arranged. The editorial comments are often helpful and are informed by a wholesome conservatism. No striking advance in any particular direction is recorded this year, but there is evidence of an immense amount of research in all corners of these fields. Many interesting cases are reported, among them one of chronic granuloma of the orbits in a negro, with extreme bilateral exophthalmos. M. Zethelius reports 45 cases of acute retrobulbar neuritis, in 36 of which the vision became normal or nearly so under treatment by lumbar puncture. There are two reports, one favourable and one not, on the treatment of optic atrophy by injections of atropine. Allergic manifestations in the nose attract much attention, and there are several useful attempts to evaluate the results of surgery and irradiation in cancer of the larynx. The book, like the previous numbers, will be very useful to those who wish to keep in touch with recent work in these subjects.

Management of Fractures, Dislocations, and Sprains

Second edition. By JOHN ALBERT KEY, B.S., M.D., Clinical Professor of Orthopedic Surgery, Washington University School of Medicine; and H. EARLE CONWELL, M.D., F.A.C.S., Consulting Orthopedic Surgeon to the Tennessee Coal, Iron, and Railroad Company. London: Henry Kimpton. 1937. Pp. 1246. 52*s.* 6*d.*

THE second edition of Key and Conwell's work is a sound and balanced exposition of treatment of injuries to bone and joint, based on what must be a wide experience of different methods. There are many photographs of the actual deformities encountered—a feature apt to be neglected in books on this subject or represented only by drawings that have done service for many years. The authors emphasise the value of physical signs in diagnosis and regret the tendency to rush for X rays without making a proper clinical examination. They do however admit the necessity and importance of radiography and include many X ray reproductions. These latter and an adequate number of diagrams are placed in satisfactory relationship to the text.

The mechanical principles which underlie the reduction of fractures and dislocations are fully and carefully explained, but more emphasis might have been laid on the value of traction and the amount of force to be employed. In general the form of splinting that is recommended is based on padded or slab plasters for cases in which displacement is not likely to recur after reduction—as in the fore-arm and wrist and leg and ankle. Where skeletal traction is

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required the Kirschner wire, ice-tong calliper, or fine pin is used. The authors' preference in treating intracapsular fractures of the femoral neck is for the Whitman abduction plaster. The use of the Smith-Petersen pin is fully described, but the question in which type of case it could or should be employed is avoided. When this book first appeared we commented on the possible lack of understanding of the principles laid down by Sir Robert Jones in advocating treatment of supracondylar fractures by flexion of the elbow-joint. The section is still a little indefinite. In discussing restoration of extension after such flexion treatment some distinction should be made between adults and children; in children the carrying of heavy weights as depicted may delay such restoration. In general the care the authors take to give a broad outlook and choice of methods in treatment may lead to confusion in the minds of the less experienced reader. For example in the case of the fractured clavicle eight methods are described and these do not include the classical Sayre's and Newmarket methods. The indications for selection of the appropriate measure in different types of case are put forward but hardly enough emphasis is laid on the fact that the ultimate functional result is equally good in any of them.

It is gratifying to find a good description of acromioclavicular dislocations in which the acromion is usually displaced downwards by the weight of the shoulder girdle as a result of tearing of the coracoclavicular ligaments in addition to those of the joint capsule. In many books the impression given is that the clavicle is displaced upwards and treatment may be based on a wrong assumption. The chapters on the skull, and on the jaws and face have been specially contributed and make good reading. Sections on workmen's compensation and on the medico-legal aspect of fractures contain many warnings of the dangers that beset the unskilled or unwary but naturally are written from the American point of view.

There is not much necessity for references; those that are given are almost exclusively American. Misprints and spelling errors are very rare. The production is admirable but the book is a little heavy—it weighs six and a quarter pounds.

The Catholic Doctor

By Fr. A. BONNAR, O.F.M., D.D. London: Burns, Oates, and Washbourne. 1937. Pp. 181. 7*s.* 6*d.*

THERE has long been a need for a simple exposition of Catholic medical ethics, written from the British professional standpoint and intelligible to the ordinary reader. In endeavouring to supply this want Father Bonnar's task has not been an easy one. He has had to master the technicalities of two vast and widely different specialties, theology and medicine, and to adjust their rival claims. An acknowledged expert in moral theology he has shown considerable tact in avoiding all pretension to personal knowledge of medical problems, but he has been at pains to collect representative medical opinions. Within a surprisingly brief compass he manages to give a general outline of the foundations of Catholic belief and of the ethical basis of the rules that bind the Catholic in dealing with problems such as contraception, the administration of baptism, and the belief in miracles. His explanations are lucid and non-technical and show a sympathetic appreciation of the non-Catholic point of view. In the chapter on "Aiding and Abetting" for example, he makes it clear that the non-Catholic patient must be given an opportunity for obtaining the treatment she wishes, even if it is opposed to Catholic teaching.

On general matters, Father Bonnar's teaching follows closely the highest traditional standards of professional conduct. The doctor, he holds, is under an obligation in religion to keep his medical knowledge up to date, to observe the code of professional ethics current in his country, and to preserve his patients' secrets inviolate. He is guilty of "injustice" in the theological sense if by reason of his incompetence he puts his patient to the expense of unnecessary consultations or if he sends his panel patients into hospital without sufficient reason. Where cleavage with non-Catholic medical practice occurs, as over the use of contraceptives and therapeutic abortion, Father Bonnar makes it clear that his position is based on a closely knit philosophy and not on mere obscurantism. Still less is it actuated by lack of humanity or respect for human life. The desirability of avoiding pregnancy in women with any form of active or recently arrested tuberculosis, or with renal disease, might however have been more clearly expressed, for it is a matter on which doctors sometimes have considerable difficulty in persuading patients. On the disputed question of the treatment of an unruptured ectopic gestation, Father Bonnar definitely supports the view, which is both humane and scientifically correct, that there can be no objection to excision at any stage since the tube itself is morbid.

The chapter on psychotherapy marks an advance in the understanding between priest and doctor. The writer wisely repudiates some of the popular generalisations about the confessional doing away with the need for psychotherapy and "every doctor being necessarily a practical psychologist." Such criticisms, he points out, "fall wide of the mark . . . there are cases which call for real psychological treatment . . . it cannot be too strongly emphasised that the priest's ministrations and especially the administration of the sacraments have no medical purpose." Yet the priest may be able to do more than anyone else in restoring that tranquility of mind which is an essential condition for sound health and in taking away the sense of guilt which is such an important factor in many neuroses. Unfortunately the chapter on "sexual aberrations" does not maintain the same level of perception. Few doctors would subscribe to his dictum on homosexuality: "in a person who has not acquired the habit of self-control, the sexual appetite, if unable to attain its normal object, will seek satisfaction in other ways. Perhaps all sexual abnormalities can be explained in this way." It is also surprising to find views on sex education so timid and reactionary. He distrusts biological teaching as likely to "arouse morbid curiosity" and recommends that until the age of 14 or 15 "children's questions should be put off with a very general answer such as that it is God who sends us all into the world, that His way of doing so is very wonderful and will be explained in due time." Long before the "appointed day" any child with a spark of spirit would have got the information it wanted elsewhere, and would incidentally have acquired either resentment or contempt for the way its very natural desire for knowledge had been met.

Apart from these flaws Father Bonnar has written a valuable book, which deserves a wide circulation among his co-religionists.

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THE LANCET

LONDON: SATURDAY, FEBRUARY 12, 1938

THE MODERN FEVER HOSPITAL

THERE was a time when people with typhoid or scarlet fever had to be removed from their homes by stealth or wile. Now the public is coming to demand the hospitalisation of infectious cases, and the list of diseases admitted to the large fever hospitals grows steadily longer. This has brought with it increasingly the danger of a patient admitted for one disease being infected with another, and the avoidance of cross-infection has taxed the administration of fever hospitals and has led to the trial of new methods of construction. The difficulties are formidable. In the first place by no means all the patients notified as suffering from this or that disease are actually found to be so suffering when the ambulance reaches the hospital. On p. 97 of the recent report [1] on L.C.C. hospitals for 1936 is a table showing errors in the notified diagnosis of cases admitted to acute hospitals; revision was required in 24 per cent. of the total notifications of diphtheria, in 34 per cent. of the enteric group, 7 per cent. of measles, 10 per cent. of scarlet fever and whooping-cough. In fact out of some 35,000 arrivals more than 4000 could not for this reason alone be admitted to open wards reserved for specific infections. When to this has been added the large number of patients who on admission were found to be suffering from more than one infection, or known to have been exposed to a second infection, it is obvious that the fever hospital must dispose of a large number of beds for the segregation of such cases.

But patients in fever hospital wards do not only run risk from the introduction and spread of extraneous specific infections. Though these may clog the administrative machinery they are of secondary importance, for they endanger life but little, whereas an outbreak of broncho-pneumonia in a measles ward may be deadly; commonly regarded as one of the inevitable perils of hospitalisation it may really be a cross-infection by hæmolytic streptococci, although of type other than that causing scarlet fever. Until lately no steps were taken to remove from the general ward such reservoirs of infection as cases of broncho-pneumonia, otitis media, impetigo, and enteritis in the course of measles. If these patients remain in the open ward without precaution of any sort there exists a perpetual state of cross-infection. Even in a scarlet fever ward where the primary infection is the hæmolytic streptococcus the retention of patients with such complications leads to the occurrence of late complications of septic type, whether due to reinfection with the same strain or with another strain of streptococcus. Adequate spacing of beds does much to minimise the danger. To overcrowd a ward is to invite a high rate of septic complications and, to put it at its lowest, is false economy. An overcrowded ward means an overworked staff, and hard pressed nurses will from time to time inevitably cut corners. Even in the well-spaced ward the device of barrier nursing should be regarded as a temporary measure unless the staff is specially experienced; otherwise a false sense of security may result. Bed-isolation, where every patient is nursed in barrier, may make it possible to segregate within a single ward any acute specific infection (other than early measles and chicken-pox), all types of extraneous non-specific conditions (such as broncho-pneumonia and otitis), and patients under observation pending diagnosis, but it is extremely exacting for the staff and the added stress may readily lead to physical breakdown among the nurses. Bed-isolation therefore cannot be regarded as a normal state of things unless the hospital can rely upon a succession of nurses well trained in general surgical work and especially in the methods of asepsis. Such a staff is not easy to recruit and retain in these days; it was much easier twenty years ago.

So far we have considered segregation based upon the invisible barrier. It is now generally accepted that the big open undivided ward is obsolete. During the transition the movable screens devised by HUTINEL many years ago are coming into use again; they afford ready means of establishing conditions resembling a partial cubicle around any bed. A convincing expression of the modern tendency may be seen in the new blocks approaching completion at the North-Eastern Hospital (L.C.C.), Tottenham, where the main wards are subdivided by glass screens into five sections each of which accommodates four beds spaced in parallel. The idea of grouping by fixed screens in these new wards is not so much to prevent the transference of specific infections as the non-specific infections of the upper respiratory tract arising from droplet spray. The ideal method of segregation is seen in the wardlet containing one or two beds with complete structural separation from the next in the series. Provided the aseptic technique, for which every facility exists, is rigidly carried out, diseases of any description may be nursed in them without spread. Such wardlets are available at the North-Eastern Hospital both in the form of annexes to the main ward blocks and as two large chamber blocks providing 112 single-bedded wardlets. When reconstruction is complete nearly 40 per cent. of the total accommodation at this hospital will be in the form of these one- or two-bedded cells. It has often been objected that children nursed in

[1] Annual Report of the London County Council, Vol. IV. (Part 1). London: P. S. King and Son. No. 3308. 2s. 6d.

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single chambers become bored and depressed. Whether this occurs or not depends largely upon the lay-out; surrounded by brick walls of the old side-ward type the children soon became dejected. It is not the experience in the new chamber blocks where glass walls afford a wide prospect for the patient as well as adequate supervision for the nurse. With these new types of ward life has become immeasurably more desirable both for the patients and those who attend on them, and it is lamentable that just when the conditions of fever nursing have become so attractive there should be a grave difficulty in recruiting enough nurses to make full use of the hospitals. This has now led to the restriction in the admission of scarlet fever, measles, whooping-cough, and dysentery to cases in which the severity of the disease and the condition of the home make hospital treatment essential. One cannot help feeling that a visit to one of the new fever wards on a bright morning would turn the scale in the decision to train as a nurse and we hope that municipal authorities will take every care to put their fever hospitals on the map.

THE SWEAT GLANDS

THE chief function of perspiration is to assist in regulating the temperature of the body; the heat lost by the skin is increased many fold by evaporation, particularly at high temperatures and during muscular exercise. Secretion of sweat, however, is not the only mechanism by which water is given off from the skin. WHITEHOUSE, HANCOCK, and HALDANE [1] found that during rest under ordinary conditions of temperature practically the whole of the moisture given off from the skin passed through by osmosis or diffusion, the osmotic passage of water increasing rapidly as the skin temperature rose and playing a large part in heat regulation. Osmotic transference is, actually, the only available mechanism of water loss from the skin for individuals with congenital absence of the sweat glands, of which a few cases have been investigated. The glands are not in fact essential for life, though their absence may be a serious handicap, especially when associated with defective regulation of the skin circulation. On the other hand excessive sweating, if combined with free drinking of water, may produce water-intoxication, either in the common form of undue fatigue or the acute form of muscle cramps. Between the extremes of total suppression and excessive loss there are many features of sweat secretion which deserve closer study. Some years ago Dr. YAS KUNO, the Japanese physiologist, drew attention [2] to something which had previously been almost overlooked—namely, sweating in response to emotion, mental effort, or sensory stimulation, with a peculiar limitation to the palm, the sole, and the axilla. In our last issue KUNO recounted further investigations of sweat secretion by himself and his associates; the results are no less surprising, though perhaps less readily susceptible of explanation, than the facts of mental sweating. It seems that a considerable number of sweat glands, although morphologically fully developed, do not secrete even under conditions which call for maximal activity. Accordingly KUNO divides the sweat glands into active and inactive. The inactive glands cannot be thrown into activity by intense body warming, even when this stimulus is repeated frequently, or by local injection of pilocarpine which acts directly on the gland cells without the intervention of nervous mechanisms. Some observations suggest that a limited activation of such inactive glands may occur during early childhood, but in the adult there are many glands which are never in action under physiological conditions, and which are therefore useless as a reserve force to be called upon when the need is urgent. It is possible that activation of inactive glands may occur under stimulation by other pharmacological agents or during the abnormal sweating responses which arise in certain pathological states of the central nervous system, and we hope that Dr. KUNO will continue this study. More data on the ratio of inactive to active glands in different situations would be valuable, and investigation would be facilitated by improved methods of recording activity of the sweat glands.

[1] Whitehouse, A. G. R., Hancock, W., and Haldane, J. S., *Proc. roy. Soc. B.* 1932, 111, 412.
[2] *Lancet*, 1930, 1, 912.

THE PROGNOSIS OF SCHIZOPHRENIA

IN another part of this issue two papers will be found, one of which briefly describes the use of Cardiazol to evoke convulsions in the treatment of a dozen cases of schizophrenia, while the other reviews the respective merits of this form of therapy and of induced hypoglycæmia, which are already the subject of temperate dispute.[1] The use of convulsions and coma to overcome the resistances of mental disorder is exceedingly dramatic and these two papers, with the discussion reported on p. 378, well illustrate what is being attempted and done. It is evident that favourable results have been reported by many competent workers, yet it is still advisable, perhaps, to approach the subject with reserve. Prima facie, it is probable that a remedy so startling, for a disease so severe, will arouse hopes and generate claims that, however sincere, have little to do with the actual efficacy of the method under trial. (The history of tuberculosis gives us plenty of examples.) Study of the natural prognosis of the condition under treatment provides some safeguard, as Dr. PULLAR STRECKER and others have recognised, against exaggerating or underrating the value of a new remedy. Yet sometimes this essential is deliberately ignored. Thus in recording their observations on the treatment of schizophrenia CAMERON and HOSKINS [2] say: "No attempt was made to select on the basis of reaction-type or on probability of recovery. Our experience in the latter regard has been that the

[1] *J. Amer. med. Ass.* 1937, 109, 1470.
[2] Cameron, D. E., and Hoskins, R. G., *J. Amer. med. Ass.* 1937, 109, 1246.

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correlation between prognosis recorded at the time of admission and subsequent progress is almost negligible." Most psychiatrists are certainly not of this opinion[3]: the factors entering into judgment are no doubt complicated, but an expert's forecast is much more often right than wrong.

A careful study made in Norway recently and reviewed in our columns[4] reaffirms that to assess prognosis in schizophrenia is by no means a deceptive exercise like casting a horoscope or reading the entrails of a sacrificial beast. LANGFELDT studied the subsequent fate of a hundred cases of undoubted schizophrenia admitted between 1926 and 1929 to the University Psychiatric Clinic in Oslo: he made personal investigations, being rightly convinced that it is inadmissible to speak of the recovery or partial recovery of any patient on the strength merely of statements made in letters from the patient or his family. As the result of his inquiry, he concludes that the boundaries of schizophrenia are now set so generously wide that several conditions, with very different prospects of recovery, may be covered by the term. The proportions in which the doomed and the atypical, more hopeful, varieties are mixed in any selection of material will determine how many "recoveries," "spontaneous remissions," "cures," are reported as characteristic of schizophrenia as a whole. LANGFELDT considers that the more optimistic results reported as obtained with insulin, say, or psychotherapy, rest on this diagnostic laxity: where there is a stricter interpretation of schizophrenia no such triumphs are recorded. It is too much to hope for the same degree of precision in the initial diagnosis of schizophrenia as is attained, for instance, with tuberculosis. There are no tangible proofs of the disease, great experience and judgment are necessary, and there is room for wide latitude of usage. It is well known that some clinics like to use independent standards and categories while clinging to the accepted names, and that diagnoses by poorly trained and inexpert psychiatrists are worthless to a much greater degree than in other branches of medicine. Hence the foolish statement is sometimes made that diagnoses in psychiatry are futile labels, not worth the affixing. Diagnosis is indeed of the first importance. Some of the most lamentable disappointments, and even tragedies, in the history of psychiatric treatment have been due to carelessness in diagnosis, and ignorance or contempt of the accepted canons. LANGFELDT'S strictures on the uselessness of bare reports of such-and-such a percentage of "cured schizophrenics" are therefore appropriate. Until this state of affairs has been remedied by the better training of psychiatrists or the discovery of some less complex and intangible criteria of diagnosis than the patient's talk and behaviour, it will be necessary for each country, and perhaps for each clinic, to work out the statistical prognosis for the cases which it has agreed to classify as "schizophrenia." In England relatively little work of this kind has as yet been published—a good thing, on the whole, since if there were a host of such studies they could scarcely be trustworthy, but would be more likely to darken counsel by their contradictions. A reliable prognostic study requires such full records and uniformity in diagnosis, so much skill, time, trained help, and personal visiting (in their homes or elsewhere) of all the patients concerned, years after they were first seen, that it cannot be carried out wholesale. LANGFELDT was fortunate enough to be able to trace all his patients. In England this is a more difficult task than in Norway, though we have here in the records of the Board of Control an invaluable centralised storehouse of material about each of the patients who may have had a relapse after discharge from hospital: failure to include individual details about such cases, which experience has shown are especially apt to evade notice in an inquiry, can make the research of very little value.

A careless investigation does nothing but harm. Careful ones go further than merely to provide comparative data for assessing the value of a new method of treatment: LANGFELDT, for example, believes that he can now distinguish in his series of cases the features which would have made it possible in the beginning confidently to tell the group of progressive cases from those in which the environmental factor was stronger than the hereditary, and outlook for more or less "spontaneous" recovery good. But wisdom after the event is justly suspect. Moreover, "spontaneous recovery" is so often used to mean recovery under favourable circumstances of care, without the use of any novel or supposedly specific method, that the efficacy of undramatic but rational measures is less regarded than it should be. All these factors must be weighed in any inquiry into the later history of schizophrenic patients. "Catamnestic" studies are difficult and, unless expertly made, deceptive: but without them the clinical psychiatrist is at the mercy of arbitrary notions, with none of those checks upon his wisdom which other doctors find, or submit to, in the autopsy room and the operating theatre.

PRESENTATION TO SIR ARTHUR KEITH

ON Monday next at 5 P.M. Sir Arthur Keith, F.R.S., will deliver a lecture at the Royal College of Surgeons of England on the Prehistoric People of Palestine. He will summarise the results of the investigations which he and Mr. T. McCown have been conducting on the anatomical characters of the Mousterian peoples discovered near Mount Carmel in 1931 and 1932. Before the lecture a bronze bust of himself will be presented to him by the president of the Royal College of Surgeons on behalf of a large number of his friends and admirers in commemoration of his twenty-five fruitful years as conservator of the museum. Executed by Miss Kathleen Parbury, the bust is of real merit and recalls one of Sir Arthur's familiar attitudes. Admission to the lecture is by ticket to be had from the secretary, R.C.S., Lincoln's Inn-fields, W.C.2.

[3] See *Lancet*, "Prognosis," Vol. I, p. 265; Faurby, A., *Nord. med. Tidskr.* 1937, 13, 206.
[4] *Lancet*, 1937, 2, 1434.

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ANNOTATIONS

ANÆSTHESIA AND THE UPPER ABDOMEN

PERHAPS the most severe test of an anæsthetist's knowledge and art is to ask him to obtain and maintain perfect muscular relaxation during an upper abdominal operation, while ensuring a minimum of trouble afterwards. That there is no royal road to these ends was well brought out by the discussion following Dr. H. K. Ashworth's admirable paper read to the anæsthetics section of the Royal Society of Medicine on Friday of last week. After describing the various methods evolved during the last decade or so, he pleaded for a crystallisation of ideas about the best procedure. Subsequent speakers showed how it seems that equally good results are obtainable with endotracheal gas-and-oxygen, local analgesia combined with light inhalation anæsthesia, the old-fashioned open ether, and the latest cyclopropane. The truth no doubt is, as Prof. R. R. Macintosh suggested, that the man is more important than the method he employs, and very diverse methods bring the same good results when conducted by anæsthetists with the same high level of skill. Nevertheless a listener to the debate found himself able to draw certain morals. The first of these was that for any long abdominal operation some measure of local analgesia is likely to be of great value. The reason that it is not more generally used seems to be that it occupies extra time for the surgeon; but such a reason is not a good one, for with proper organisation the surgeon should be free to employ what he considers the best possible technique, and should not have to consider time except in so far as it affects the patient's welfare. If the extent of his hospital operating-list is such that he is indeed handicapped in this manner, then alteration is called for in the organisation which makes lists of this kind necessary. Another notable feature of the discussion was that there seemed to be no doubt about the deleterious effect of long deep ether anæsthesia, though when the operator is speedy the older methods, which rely mainly on ether, yield excellent results. Dr. Ashworth recommended a week or more of training for the patient who is to undergo a deliberately planned operation on the upper abdomen, and another speaker would add to it special breathing exercises, so that during recovery the patient should employ his accessory muscles of respiration when the diaphragm is hampered by the incision. Opinion as to the value and the risk of spinal analgesia for upper abdominal operations appeared to be as varied as ever. The lamentable results described by one speaker were balanced by the satisfaction expressed by others who had employed it for similar operations. Some of the most interesting—or at least most novel—views related to the decontrol of patients after inhaling the high oxygen percentages given with cyclopropane, and to the measures by which the need for any such decontrol may be avoided.

EXPERIMENTAL RENAL HYPERTENSION

Richard Bright in 1827 described enlargement of the heart in fatal cases of kidney disease. Since his time much confusion has arisen from our ignorance of the relationship between renal disorder and high blood pressure, and of late years the problem has often been tackled afresh. Many workers have studied the hypertension that follows incomplete occlusion of the renal arteries in animals, and it has been clearly shown that the rise in blood pressure is not brought about by a nervous reflex from the kidney. Moreover, renal insufficiency is not essential for its production, since the blood pressure rises after incomplete occlusion of one renal artery. The theory that a damaged kidney may release a pressor substance into the circulation takes us back to Tigerstedt and Bergman's [1] observations at the end of last century. They gave the name "renin" to a pressor principle which they demonstrated in saline extracts of the rabbit's kidney. Harrison and his co-workers,[2] at Nashville, Tennessee, who have produced hypertension in dogs by the method described above, state that on injection into rats saline extracts of the ischæmic kidneys have a greater pressor activity than have normal kidney extracts. There is no evidence however that this increased pressor activity is responsible for hypertension in the dog, and attempts to demonstrate circulating pressor substances have been unsuccessful. It has not been shown that the ischæmic kidneys contain an excess of the normal pressor substance (renin) or indeed whether the latter plays any part in the regulation of the blood pressure. These problems demand a more exact chemical analysis of extracts obtained. Nevertheless the above experiments suggest a physiological rôle for pressor substances derived from the kidney, and if this is substantiated we may hope for a clearer understanding of the relationship between hypertension and renal disease in man.

LETHAL GASES IN HYGIENE

IN these days when the word "gas" suggests masks for babies, decontamination squads, and other horrors, it is pleasant to survey the diversity of uses to which poisonous gases can be put in the service and not for the destruction of mankind. At a meeting of the epidemiological section of the Royal Society of Medicine on Jan. 24th Dr. P. G. Stock of the Ministry of Health made such a survey. The subject of lethal gases and their use in disinfection and disinfestation is one that he has made his own and he spoke from the experience of many years.

Lethal gases are used in disinfection; in the purification of water and sewage; in the destruction of vectors of disease, such as rodents, fleas, mosquitoes, and lice; and for the eradication of insects, such as the bed-bug and other pests, for economic reasons. In disinfection the burning of sulphur has been known from remote times, being mentioned by Homer and Hippocrates. As for rodents, the most important use of gas is in the deratisation of vessels, which received a great impetus from the International Sanitary Convention of 1926. The destruction of lice, fleas, and mosquitoes has also been effected by gas, while the disinsectisation of aeroplanes is becoming more and more important with increasing danger of the spread of yellow fever by air traffic. In a plane more even than anywhere else is it essential that, if a lethal gas is employed, no traces shall remain that might affect the occupants. In addition, problems of weight are important when apparatus has to be carried in aircraft, and although great advances have been made the ideal means of ridding aeroplanes of insects has not yet been found. Disinfestation in general is complicated by the varying resistance of different kinds of insects to the same

[1] Tigerstedt, R., and Bergman, P. G., *Skandv. Arch. Physiol.* 1898, 8, 223.
[2] Harrison, T. R., Blalock, A., Mason, M. F., and Williams, J. R., *Arch. intern. Med.* December, 1937, p. 1058.

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gas. The crew of a vessel will judge the efficacy of a fumigation by its effect on those crickets of the sailor's hearth, the cockroaches. In actual fact, however, as Dr. F. H. White, late chief medical officer to the Port of London Authority, remarked in the discussion on Dr. Stock's paper, cockroaches only become a public health problem when they invade the first-class passenger cabins.

It was natural that Dr. Stock should have much to say about hydrogen cyanide, in view of its widespread use and dangerous properties. He agreed with American experience that the admixture of lacrymatory gases is liable to lead to a false sense of security. In the eradication of bed-bugs, in houses and furniture particularly, various new gases have been tried such as orthodichlorbenzene, ethylene oxide, and heavy naphtha. All have their disadvantages and a really satisfactory gas has yet to be discovered. A good deal of research is now going on under the auspices of the Medical Research Council, but in practical fumigation we are still behind the United States, where ship fumigation, for example, is done by the U.S. public health service. In this country, as Dr. White pointed out, fumigation is in the hands of commercial enterprise and is carried on for profit. Anyone may set up as a contractor and send inexperienced men to scatter such highly dangerous substances as cyanide in such manner as seems best to them. This has occasionally led to neglect of elementary precautions and consequently to fatalities. Under the Hydrogen Cyanide (Fumigation) Act, 1937, however, regulations have now been drafted under which an operator engaged in such work must have had not less than two years' regular experience of fumigating buildings with hydrogen cyanide.

IDIOSYNCRASY TO TOBACCO

APART from the familiar distressing effects of first attempts at smoking, which pass off when tolerance is acquired, two types of abnormal reaction to tobacco may be distinguished: first, a tobacco allergy which may be demonstrated by skin tests, and secondly, a true idiosyncrasy, an exaggeration of the effects of tobacco on a normal person. Sulzberger [1] found that 16 per cent. of non-smokers, 36 per cent. of smokers, and 77 per cent. of patients with thrombo-angiitis obliterans gave positive skin reactions to patch-tests with tobacco. These people were unaffected by a nicotine solution and reacted to denicotinised tobacco, so that they were probably sensitive to tobacco proteins or the bacterial proteins produced in the process of curing rather than to nicotine. This was confirmed by their being affected differently by different brands of tobacco.

Experimentally the injection of nicotine produces a transitory rise of blood pressure with peripheral vasoconstriction, and as about half of the nicotine in tobacco comes out in its smoke, one would expect that smokers would show similar effects. Lampson [2] found that a group of healthy students after inhaling tobacco smoke showed an average rise of 12–15 mm. in systolic blood pressure, an acceleration of up to 20 beats per minute in pulse-rate, and a decrease of about half in the blood flow in their peripheral vessels. Haggard and Greenberg [3] have observed a rise of blood-sugar after smoking and suggest that this and the vascular changes result from an increased secretion of adrenaline due to the sympathetic stimulation of nicotine.

[1] Sulzberger, M. B., *J. Immunol.* 1933, **24**, 85, 265, and 425.
[2] Lampson, R. S., *J. Amer. med. Ass.* 1935, **104**, 1963.
[3] Haggard, H. W., and Greenberg, L. A., *Science*, 1934, **79**, 165.

In the normal person these effects are negligible, but exceptionally they may be so exaggerated as to cause definite symptoms. Herrell [4] has lately described the case of a man of 57 who had attacks of severe dizziness and mental confusion which came on after his morning cigarette. His blood pressure before smoking was 118/70 mm., but three minutes after a cigarette it rose to 180/110 mm. and he felt dizzy for an hour or so. This was associated with vascular spasm, for there was a fall in the surface temperature of his fingers of from 1 to 1½° C. Immersion of his hand in ice-cold water, which normally causes a slight rise in blood pressure, produced the same exaggerated rise. He showed no skin reaction to a patch-test with tobacco. He had no more attacks when he gave up smoking, and a troublesome urinary frequency which he had had, and may have been due to the effects of transitory rises of blood pressure on his renal activity, also disappeared. There was no question of allergy here, but an unusual susceptibility to nicotine. Patients with essential hypertension respond to the cold test as this man did, and it is possible that many of them react similarly to tobacco.

FRACTURES OF THE HANDS AND FEET

THE aims of treatment are somewhat diverse in fractures of the hands and of the feet, as was apparent in the discussion last week in the section of orthopædics of the Royal Society of Medicine. In the foot the objective is painless weight-bearing; in the hand it is to restore full function without stiffness. There is disability in fractures of tarsal and metatarsal bones when bony deformity leads to uneven stress and strain on the all-important ligaments supporting the arches of the foot. From this it follows that anatomical reduction of fractures is a vital consideration, and that fixation should be prolonged during the whole period of consolidation. The hand is a more primitive structure. The elaboration of its function depends on its intricate muscular development, extensively represented in the motor cortex, and on the freedom of movement possible as its many joint surfaces. In any injury of the hand attention must first be focused on retaining free muscular movement. According to Mr. Norman Roberts, one of the openers of the discussion, it is a mistake to strive after perfect anatomy where it can be obtained only at the expense of stiff fingers. He cited over-splinting and splinting of the knuckles in the extended position as the two commonest mistakes in treatment. Knuckles kept for a prolonged period in extension always become stiff, and this is particularly true with fractures involving the heads of the metacarpals. He is opposed to the method of treating these by bandaging the fingers round a bandage or ball held in the palm of the hand, because this immobilises the fingers completely. He prefers a dorsal plaster cast moulded round the hand and allowing use of the fingers from the start. He employs extension to reduce angulation deformity where it is severe, but not specifically to reduce shortening, for this is rarely disabling. Bennett's fracture-dislocation of the bone of the first metacarpal is the one fracture requiring a combination of continuous traction with plastic splinting. The straight splint for the fingers was roundly condemned by more than one speaker. Broken phalanges should be treated in flexion, either by wire splints or by dorsal strapping carried down to the front of the wrist. The minimum of splinting

[4] Herrell, W. E., *Proc. Mayo Clin.* 1938, **13**, 1.

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and the earliest possible restoration of function was advocated.

In the foot to reconstruct the skeleton is the surest means of restoring function. Eastwood,[1] it is true, has recently reported a series of fractures of the os calcis in which good function was restored without attempting to reduce the deformity. But most surgeons insist that strong and painless feet are obtained only when the alignment of joint surfaces is as nearly as possible anatomical. Mr. Gordon Irwin said that his investigation of the results obtained by modern method has convinced him that all the efforts at efficiency had justified themselves. The insurance companies' statistics showed that the period of disability in fractures of the metatarsals had been cut down to a half or two-thirds of that of ten years ago. All his patients with these fractures now returned to full work, and this most often meant heavy industrial labour. The two principles of modern treatment were accurate anatomical reduction of deformities and fixation in a plaster splint that allowed walking without weight-bearing on the fractured bones. He believed that the stress of using the limb is one of the most potent factors in ensuring bony union. An important consideration in restoring a foot to normal function is the length and shape of the first metatarsal. Impaction of this bone in malposition must be very carefully corrected, and if there is angulation of its shaft, it is far better that it should be bent dorsalwards than plantarwards. Continuous traction to correct shortening may be necessary in fractures of metatarsals. Mr. Irwin drew attention to the great danger of forcible manipulation to mould fractured feet in a late stage when there was much swelling and œdema, for this might cause gangrene of the foot necessitating amputation. Gradual traction by Böhler's method was much safer than manual manipulation at this stage. During the late war, "march foot" in young recruits attracted considerable attention. It is known that this particular variety of painful foot is due to a fracture of one of the middle three metatarsal bones across its neck. Mr. Irwin finds this same fracture in nurses during the early months of their training. He attributes the injury to a sprain of the interossei followed by œdema and by decalcification of the metatarsals. Weight-bearing then cracks the weakest bone or that bearing the most strain. It is most important that immobilisation of the foot should be prolonged until it is firmly consolidated if recurrence is to be avoided.

THE NORMAL ELECTRO-ENCEPHALOGRAM

THE rapidity with which physiological discoveries are absorbed into clinical science sometimes prevents due attention being paid to the scientific significance of the discoveries themselves. The successful application of electro-encephalography to neurological diagnosis must not conceal either the empirical nature of the technique or the importance of experiments on normal subjects. A paper by Jasper and Andrews [2] shows how little is known and how much may yet be discovered about the electrophysiology of the normal human cortex. Using apparatus and methods almost identical with those developed in this country for the diagnosis of cerebral tumours and epilepsy, these American workers claim that there are at least two, and possibly three or more, distinguishable electrical rhythms in the normal brain, and that these rhythms are localised in origin. The "alpha" potentials, which were for some time called the "Berger rhythm," have a frequency of about 10 per sec., are inhibited by visual activity, and are most prominent in the occipital region. The 25 per sec. "beta" rhythm is more characteristic of the precentral cortex and is sensitive to inhibition by unexpected touching of the body. The "gamma" rhythm is even faster, and little is known about it except that it is rare. These potential rhythms seem to resemble in some ways the characteristic local action potentials described by Kornmüller [3] in animals, but the variability between individuals and in the same individual from time to time is very much greater in the human subject, and the hoped-for correlation between electrical rhythm, histological structure, and physiological function is still far from established.

The most striking property common to all these brain rhythms, at least the one most puzzling to the physician, is that they all—visual alpha, sensori-motor beta, problematical gamma, and pathological delta—seem to indicate varying degrees of rest on the part of the cortex. Perhaps, in order to distinguish them from the fading memories of text-book physiology, we should call them "inaction potentials."

BARBITURATE POISONING

THE barbitone group of hypnotics form a convenient if uncertain vehicle for the suicide, and in France there have been intermittent epidemics of their use for this purpose. Carrière and Huriez [4] of Lille saw 32 cases of barbiturate poisoning in the four years 1934–37 with 7 deaths. Of the persons concerned 27 took phenobarbitone, 2 Veronal, 2 Allonal, and 1 Dial; 25 were women and 7 men. They could be divided into three classes, according to the dose of drug taken: a "subcomatose" class who took from 1 to 2 grammes and recovered spontaneously after sleeping 10–20 hours; a "curable comatose" class who recovered with treatment after being comatose for 3–20 hours; and a "malignant" class who took from 6 to 11 grammes and died after a coma lasting 21–72 hours. The prognosis, then, depended largely upon the dose taken, though people have been known to recover after taking as much as 15 g. of veronal. Age and previous medical history did not seem important in this series, but the outcome was influenced by delay before treatment was started. The cured cases all received treatment within ten hours, whereas all but one of the fatal cases were treated later. Serious signs during the coma were: a temperature over 102° F.; a considerable increase in leucocytes, especially polymorphs; extensive chest complications; a severe fall in blood pressure; and signs of renal failure. One woman of 22, who died after taking 6 g. of phenobarbitone, had a temperature of 105° F., a white cell count of 40,000, including 90 per cent. polymorphs, and an extensive bronchopneumonia. Carrière and Huriez advise preliminary gastric lavage or apomorphine, then adrenaline or Coramine (3 c.cm. hourly intravenously) if there is circulatory depression, bleeding if there is cyanosis, and oxygen if there are pulmonary complications. In severe cases they give a 30 per cent. solution of alcohol intravenously every two hours. Though coramine and alcohol neutralise the effects of the barbiturates in animals, they have not been strikingly successful in man, and Carrière and Huriez pin their faith to strychnine. Where this can be given within

[1] Eastwood, W. J., *Brit. J. Surg.* 1938, 25, 636.
[2] Jasper, H. H., and Andrews, H. L., *Arch. Neurol. Psychiat., Chicago*, January, 1938, p. 95.
[3] Kornmüller, D. E., Die bioelektrischen Erscheinungen der Hirnrindenfelder, Leipzig, 1937.
[4] Carrière, G., and Huriez, C., *Echo méd. Nord.* December, 1937, p. 687.

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two or three hours, they say, a dose of 20–50 mg. of strychnine sulphate every 20 or 30 minutes will bring a patient out of coma in a few hours, though they admit that there is some danger of strychnine poisoning. One of their patients, however, died although she was treated within two hours and given a total of 785 mg. of strychnine.

Strychnine certainly cannot be regarded as a specific, and wider trial should perhaps be made of picrotoxin. The use of this remedy in chloral hydrate poisoning was suggested by the late Sir James Crichton Browne in 1875, and Maloney, Fitch, and Tatum (1931) found it more effective than strychnine in barbiturate poisoning of animals. Kline, Bigg, and Whitney[5] gave it successfully to a student of 20 who took thirty Amytal tablets, a total of 3 g., and became deeply comatose. His stomach was washed out and 23 doses of 0·003 g. of picrotoxin were given subcutaneously within the next sixteen hours, with glucose intravenously. After this period he began to move about and recovered uneventfully. He had shown, however, none of the signs that the French writers consider to be of serious import.

STERNAL PUNCTURE

IN the last few years examination of bone-marrow removed by sternal puncture has become a routine in several hæmatological clinics. A valuable review of 246 cases studied by this method has been published by Vogel, Erf, and Rosenthal.[6] Their differential counts on a series of normal marrow samples closely agree with those of other observers. They conclude that sternal puncture is useful in the diagnosis of Gaucher's disease, myelomatosis, leishmaniasis, malaria, and carcinoma with generalised bone metastases, and particularly in aleukæmic types of leukæmia. They found it also of confirmatory value in leukæmia, leucopenic infectious monocytosis, agranulocytosis, pernicious anæmia, sprue, hæmolytic jaundice, polycythæmia, and aplastic anæmia. In hæmolytic jaundice the marrow is normoblastic, which allows a rapid differential diagnosis to be made in cases of chronic jaundice. Polycythæmia showed two interesting marrow characteristics—the erythropoietic elements were decreased in number, and the predominating cells were mature polymorphonuclear leucocytes. In conditions other than those mentioned a study of the marrow was not found helpful. Unfortunately from the paper the clinical differentiation between what the authors call leucopenic infectious monocytosis and agranulocytosis is not altogether clear, though from reading the case reports it appears that the former title is given arbitrarily to cases with agranulocytosis in the peripheral blood that recover and the latter to those that do not. They state that the number of nucleated marrow cells was normal in the benign type—in which also there is an increased number of myelocytes—but greatly diminished in the fatal form.

Where the monocytes originate is still obscure. It is of interest, therefore, that in this series of 246 patients monocytes were found in the marrow only twice, though 5 cases with an increase in the peripheral blood were studied. No apparent variation in the quality or quantity of cytoplasm of the megakaryocytes was found in 9 patients with thrombocytopenic purpura, and splenectomy had no effect on them though the peripheral platelets rose to normal. In infectious mononucleosis the marrow always showed an increase in lymphocytes. No correlation was found between the number of eosinophils in the peripheral blood and those in the marrow in a miscellaneous group of patients with eosinophilia. The illustrations to this study are not helpful, but a small monograph on the same subject by Schulten[7] has some excellent colour prints of the marrow pictures in different diseases.

All those who have experience of this method of studying patients with blood dyscrasias agree that in a proportion of cases it assists in diagnosis. It is clearly a useful means of analysing the marrow reactions in obscure conditions such as agranulocytosis and obscure anæmias as has been emphasised recently in our columns by Zanaty.[8]

MALE HORMONES IN GYNÆCOLOGICAL PRACTICE

THE paper by Dr. Loeser on p. 373 raises a question related to one discussed in a leading article last week—namely, the suggested treatment of chronic cystic mastitis with œstrogenic hormone. The basis of such therapy is the observation in animals that an excess of œstrin in the blood depresses the gonad-stimulating powers of the pituitary, and thus leads to a decrease in the amount of œstrin secreted by the ovaries. Dr. Loeser has treated ten cases of menorrhagia, and two of chronic cystic mastitis, with testosterone propionate, and he thinks that the success achieved is similarly due to suppression of the gonadotropic activity of the pituitary and to a consequent reduction of ovarian secretion. That testosterone can in fact suppress ovarian activity and uterine bleeding has been shown by Zuckerman,[9] working on monkeys, and one part of Dr. Loeser's speculation thus has an empirical foundation. Observations published by Salmon[10] provide some factual basis for the second part of his speculation. Ovariectomised women, or menopausal women with failing ovarian function, excrete more gonadotropic hormone and less œstrogenic hormone than do normal women. Salmon investigated a patient, aged 46, whose ovaries and uterus had been removed at operation and who suffered from typical menopausal symptoms. He found that the injection of testosterone propionate gave considerable relief from the symptoms and also reduced the amount of gonadotropic hormone recoverable from the urine. Simultaneously the vaginal smear was transformed from the "anœstrous" to the "œstrous" type. These observations suggest—though they certainly do not prove—that testosterone propionate does in fact cause changes in the pituitary.

In considering the complicated reactions with which Dr. Loeser is dealing one must bear in mind that he provides no direct evidence that ovarian activity was suppressed in the patients he treated. Testosterone propionate does not necessarily have the same action on the ovaries of different species, and it is perhaps unsafe to transfer to women observations that have been made on monkeys. For example, McKeown and Zuckerman[11] have shown that in the rat the inhibition of uterine changes which the hormone causes is associated with luteinisation; and here, too, it is unknown whether or not

[5] Kline, E. M., Bigg, E., and Whitney, H. A. K., *J. Amer. med. Ass.* 1937, 109, 328.
[6] Vogel, P., Erf, L. A., and Rosenthal, N., *Amer. J. clin. Path.* 1937, 7, 436.
[7] Die Sternalpunktion als diagnostische Methode. By Prof. Dr. Hans Schulten. Leipzig: Georg Thieme. 1937. Pp. 82. R.M. 18.
[8] Zanaty, A. F., *Lancet*, 1937, 2, 958, 1365.
[9] Zuckerman, S., *Lancet*, 1937, 2, 676.
[10] Salmon, U. J., *Proc. Soc. exp. Biol., N.Y.* 1937, 37, 488.
[11] McKeown, T., and Zuckerman, S., *Proc. roy. Soc.* B, 1937, 124, 362.

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the ovarian change is an indirect one resulting from primary changes which have taken place in the pituitary. If, however, the fact that ovarian function and uterine bleeding can be suppressed in monkeys is accepted as a basis for clinical practice, certain possibilities are immediately suggested. In the first place, as Dr. Loeser has shown, uterine bleeding should be stopped by administration of the hormone, and it is of interest that the menorrhagia which he successfully treated had resulted both from uterine fibroids and from a hyperplasia of the endometrium. In the second place, it should be possible to stop follicular growth and ovulation, and there is the possibility that certain cystic conditions of the ovary could be relieved by the same means. Furthermore, mammary disorders which result from excessive œstrogenic stimulation would presumably be benefited by this form of treatment, and Dr. Loeser's two cases, which confirm the experience of Desmarest and Capitain,[12] give substance to this possibility.

The aim of all such treatment is, of course, the suppression of ovarian activity, and whether or not such suppression results secondarily from changes in the pituitary, it is clear that testosterone is a safer agent for bringing it about than œstrone; for, as we pointed out last week, testosterone, unlike œstrone, is not known to play any part in the production of cancer. Nevertheless, although no ill effects have as yet been described in the clinical use of testosterone in women, this substance might possibly have unwanted results in gynæcological practice. As Zuckerman has shown, it can cause masculinisation of the external genitalia in monkeys, and this response is even better seen in rats. Moreover, it has been demonstrated by Scipiades[13] and by Hamilton and Gardner,[14] working on rats, that the hormone has certain adverse effects when administered during pregnancy. Great care will therefore have to be taken in the gynæcological application of testosterone propionate. Since the experimental evidence promises well for the future of this form of therapy, it is encouraging to know that Dr. Loeser observed no harm after the administration of as much as 1500 mg. of the hormone to a woman over a period of seven months.

THE HANBURY MEDAL

AT a meeting convened for the purpose at the headquarters of the Pharmaceutical Society on Tuesday evening Mr. T. Marns, president of the society, formally presented the Hanbury medal to Prof. R. Wasicky, chief of the Pharmacognostic Institute of Vienna University, who then delivered his lecture on modern points of view and methods in pharmacognosy. Prof. Wasicky began his scientific career as a pupil of August v. Vogel and became an assistant under his successor Moeller. In 1920 he was appointed chief of the institute and from 1924 to 1926 he was dean of the medical faculty in the university. He is president of the Austrian Pharmacopœia Commission and was the first chairman of the International Association for the promotion of the production and utilisation of medicinal and aromatic plants. In 1935 an honorary degree was conferred on him by the Paris Sorbonne. Prof. Wasicky's research work covers a wide field. He has conducted many investigations into methods of drug assay; he has also made contributions to the development of microchemical methods for the identification of alkaloids and other principles of vegetable drugs. He has exerted a strong influence upon pharmacognosy through his text-books which are widely used. The Hanbury medal, it may be recalled, was founded in 1881 to commemorate Daniel Hanbury, an eminent British authority on materia medica. It is awarded periodically for promotion and prosecution of research in the chemistry and natural history of drugs, and among past recipients are research workers in Great Britain, Europe, and the United States.

[12] Desmarest, E., and Capitain, Mme., *Pr. méd.* 1937, **45**, 777 and 1109.
[13] Scipiades, E., *Proc. Soc. exp. Biol., N.Y.* 1937, **37**, 242.
[14] Hamilton, J. B., and Gardner, W. U., *Ibid*, p. 570.

PIGMENTATION AND STATURE

AN association between stature and hair and eye colour that might well have to be taken into account in using physical measurements as indices of nutritional well-being has been observed by M. A. MacConaill[1] in 2500 Sheffield male school-children. He divides the children into three groups—namely, blond (blond hair and blue eyes), brunette (brown or black hair and brown eyes), and heterochrome (all other combinations of hair and eye colour). In average stature the homochrome classes, the blond and brunette, do not differ significantly from one another. But both are taller at every age from 5 to 17 than the heterochrome group, and are also less variable in the stature of the individuals comprising their group. The mean difference between them and the mixed class is just over 1¼ in., or as much as half the amount that has been quoted as differentiating elementary and public school-children. The mean rate of growth over the whole period of years 5–17 does not differ between the groups, but the acceleration that accompanies puberty is rather greater with the brunettes and blonds than with the mixed group. For accurate estimates of the effects of dietary experiments or of daily environment it seems that we may now need a survey of pigmentary types in addition to the battery of physical, physiological, and psychological tests that falls to the normal lot of a modern school-child. It would be interesting to know whether, and if so to what extent, weight and facility for increasing weight are associated with pigmentation. For since weight and stature usually show an appreciable degree of correlation with one another, it seems inevitable that the former as well as the latter must bear some relationship to colour.

[1] *Ann. Eugen., Camb.* January, 1938, p. 117.

A NEW RESEARCH FELLOWSHIP

THE Medical Research Council have been entrusted with an annuity of £350 for twenty-five years, provided by the late Mr. Eugen M. Schlesinger and by Mrs. Schlesinger to establish a memorial to their daughter in the form of a Kathleen Schlesinger research fellowship. This is to be given for investigations into cysts of the brain or allied conditions, and will ordinarily be tenable at the National Hospital for Diseases of the Nervous System, Queen-square, London, for periods of from one to three years. Awards will be made by the Council with the assistance of a special advisory committee appointed in terms of the trust deed.

WE have to record the death on Feb. 8th, at the age of 97, of Sir JOSIAH COURT at his home at Staveley, Chesterfield. His report, published in 1891, on the eyes of coal-miners in Derbyshire, Durham, Forest of Dean, and Belgium, initiated the inquiry into the origin of miners' nystagmus, and was instrumental in obtaining better lighting in the mines.

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SPECIAL ARTICLES

DIPHTHERIA—A PREVENTABLE DISEASE *

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BEFORE the introduction of active immunisation against diphtheria, no substantial reduction in that disease was evident in the Dominion of Canada (FitzGerald 1928). Although diphtheria antitoxin was made freely available to practitioners by the public health authorities in almost all parts of the country, for prevention as well as for treatment, the morbidity-rates maintained their previous high levels.

This is not to say, however, that all efforts at control—isolation of cases and quarantine of contacts, separation of other members of the family, and prophylactic antitoxin—were entirely barren of results. The recorded morbidity-rates of diphtheria are the resultants of different influences in different periods. For example, environmental changes, such as urbanisation of the population, with greater opportunities for human contact, might well have caused a real increase in cases if there had been no control measures; the wider use of laboratory services may have revealed cases otherwise undiagnosed; the use of public health nurses and school nurses may have resulted in more complete notification; and the changing clinical conception of the disease may have included cases of a kind that would not have been included in earlier years. While correction cannot be made accurately for such factors, their possible influence on recorded rates cannot be neglected in making comparisons.

TABLE I—DIPHTHERIA DEATHS: CANADA REGISTRATION AREA * 1921–25

Age.	Number.	Per cent.	Age.	Number.	Per cent.
Under 1	271	5·8	0– 4	1932	41·7
1	306	6·6	5– 9	1723	37·2
2	397	8·6	10–14	611	13·1
3	486	10·5	15+	369	8·0
4	472	10·2	Total	4635	100·0

* As Quebec Province did not join the Registration Area until 1926, this Table does not include the data for that province.

Be that as it may, the case-fatality rates and the specific mortality-rates had been falling for over fifty years. But they were still high. From 1920 to 1924 the mortality ranged from 23·2 to 12·8 per 100,000 with 1200–2000 deaths, or an average of 1600, as the annual toll. Over 40 per cent. of that mortality was supplied by the 0–4 age-group as shown in Table I. In that period, throughout Canada, diphtheria ranked as the chief cause of death in the age-group 2–14, accounting for over 15 per cent. or 1 in 7 of all deaths in that age-group (FitzGerald 1930).

* Presented, in abstract form, at the Second International Congress for Microbiology (Sect. 8), London, July, 1936. Later data and references have been included for publication.

INTRODUCTION OF TOXOID

Not until 1925 was there general agreement among public health workers in Canada in respect of a suitable agent for immunisation. In that year, as a result of the work of Ramon, diphtheria "anatoxine" or formol toxoid, prepared in the Connaught Laboratories, University of Toronto, was distributed to the provincial and local departments of health throughout Canada. This was done after careful laboratory and clinical studies had demonstrated its merit on the basis of innocuity and immunising properties as a specific preventive against diphtheria.

Reaction test.—Early experience showed that toxoid causes unfavourable reactions when given to certain individuals. The reaction test, however, devised by our colleague Dr. P. J. Moloney, made possible the detection of persons who might show untoward reaction if given toxoid (FitzGerald 1926, Moloney 1926, Moloney and Fraser 1928). This has eliminated the fear of reactions and thus has greatly facilitated the wide use of toxoid. The reaction test consists of the intradermal injection of 0·1 c.cm. of suitably diluted toxoid. A positive reaction (redness) indicates specific sensitivity induced by previous association with the diphtheria bacillus or by artificial immunisation. A larger area of redness, or more particularly of induration, at the site is an indication of the likelihood of that individual showing an untoward sensitivity reaction if given toxoid (Burke 1930). Such "reactors" are found mainly among older children and adults. The majority of reactors possess a high degree of antitoxic immunity and the incidence of diphtheria in them is much less than in their unselected controls (Ross and McKinnon 1931). It must be emphasised, however, that a positive reaction test in any individual is not proof of immunity. Antitoxin titrations reveal that some reactors have no detectable antitoxin (<1/500 unit per c.cm. serum). Reactors may be readily immunised with diluted toxoid. In some instances the antigen in the test itself may be sufficient to complete the immunisation. The number of positive reactions which may be found depends on several factors: age, diphtheria history, and environment, and probably too on the material used. Wide variations in observations made in different places are therefore to be expected.

In Canada diluted toxoid has been used for the past twelve years, with advantage, as a control in the Schick test (Moloney and Fraser 1928).

LIMITATIONS OF THE SCHICK TEST

As the Schick test is used to a great extent in studies in diphtheria, especially in estimating the efficiency of various prophylactics, reference may be profitably made to certain of its limitations. The standards in various countries are not identical. For example, the international standard and the standards laid down by regulation under the Therapeutic Substances Act of Great Britain and by regulation under the Food and Drugs Act of the Dominion of Canada differ from those prescribed by regulations of the Treasury Department of the United States of America (administered by the

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TABLE II—ANTITOXIN TITRES CORRELATED WITH INTERPRETATION OF SCHICK TESTS

Agreement of the six Schick readings.	Number.	Antitoxin titre.						
		<1/500	≥1/250 <1/100	≥1/100 <1/50	1/100	≥1/50 <1/30	1/30	>1/20
All positive	33	33	..	..	..	..	..	..
All negative	24	..	2	1	1	2	..	18
Non-interpretable	7	3	..	..	..	..	1	3
Frank disagreement	23	6	..	..	1	2	..	14
Total	87	42	2	1	2	4	1	35

United States public health service through the National Institute of Health).

In Table II is shown the disagreement found by using six different Schick tests in 87 individuals (Brandon and Fraser 1936). It is evident that among both those with high antitoxin content and those with no antitoxin (<1/500) there was frank disagreement in the results. The Table also shows that the lowest level of antitoxin associated with a Schick-negative state is about 1/250 unit. This is in agreement with the work of others.

In Fig. 1 are shown the results of six Schick tests done with six different products simultaneously in one individual who possessed more than 1/50 unit of diphtheria antitoxin per c.cm. of blood-serum (Brandon and Fraser 1936.) The lack of uniformity and the possibility of wrong interpretation need no further comment. Taylor and Moloney (1937) have analysed 15 Schick-test preparations in regard to toxicity and combining power and correlated the results with the reactions obtained in individuals whose blood-serum antitoxin was titrated. Their observations indicate clearly the desirability of revising Schick-test requirements.

This must not be construed as undue criticism of the Schick test. It is an instrument which has yielded invaluable information in the epidemiology of diphtheria. Its inherent limitations including its fallacies must be understood, however, so that unwarranted conclusions be not drawn from the results obtained.

COMPARISON OF ANTITOXIN RESPONSE TO VARIOUS ANTIGENS

In determining the antigenicity of various prophylactic preparations and in differentiating between them, the Schick test may be of little value (Fraser and Halpern 1935a). While it will show a difference between a very poor prophylactic and a good one, it will not differentiate between two of a higher order of efficiency. For such differentiation, titrations of the blood antitoxin, as recommended by Fraser and Halpern (1935b, 1937), give much more reliable and complete information.

For full details in this connexion reference should be made to the original publications. In Table III are shown the antitoxin responses induced by various prophylactic procedures. It must be emphasised that these comparisons were made in children whose complete susceptibility was established before being given the prophylactic. In Group 1 the Schick test and reaction test were used to select the children and all were frankly Schick-positive and reaction-test-negative. In the other groups, antitoxin titrations of blood-serum showed that all had initially less than 1/500 unit. This is, we think, most significant, as it is essentially for such individuals that prophylaxis is necessary. The suggestion that one or two doses of alum-precipitated toxoid will give as satisfactory antitoxin response as that induced by three doses of unmodified toxoid is not borne out by these results.

Even more striking is the difference found in the duration of high antitoxin content, as shown in Table IV. It is evident that at approximately one

TABLE IV—COMPARISON OF ANTITOXIN TITRE AFTER

A = One dose alum-precipitated toxoid
B = Three doses unmodified toxoid
Original titre <1/500

Per cent. with—	After—					
	10 wks.		10–14 mths.		22–25 mths.	
	A	B	A	B	A	B
1/100 or > units ..	68	91	22	97	15	86
1/50 or > units ..	40	91	14	75	15	76
Number of children	40	35	36	32	26	21

TABLE III—DIPHTHERIA ANTITOXIN RESPONSE TO ANTIGENS IN CHILDREN

Group.	Antigen.	Number tested.	Percentage distribution by antitoxin levels (units) three months after toxoid.							
			1/500 and >	1/250 and >	1/100 and >	1/50 and >	1/20 and >	1/10 and >	1/5 and >	1/2 and >
1	3 doses .. 15–20 Lf (2 c.cm.)	108	99	99	96	94	89	76	52	21
2	2 „ .. 50 Lf (2 „)	105	80	70	60	45	35	—*	15	5
3	2 „ .. 20 Lf (2 „)	48	75	60	40	27	8	—*	2	0
4	2 „ .. 20 Lf (1·5 „)	48	60	50	29	17	15	—*	15	4
5	1 dose alum ppt. (1 „)	40	97	—*	67	40	—*	15	—*	12
6	2 doses „ (1 „)	36	97	97	97	86	86	39	25	—*

—* Not tested at this level.

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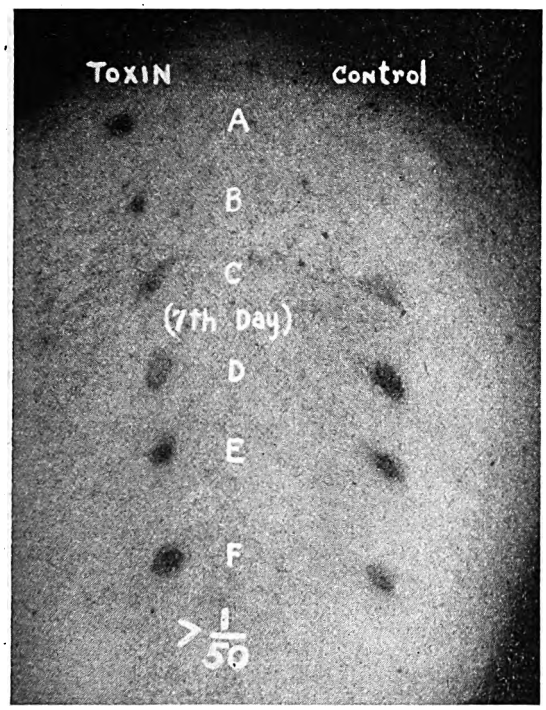

FIG. 1.—Results of Schick tests done simultaneously with six different products.

year after being given three doses of toxoid, over 90 per cent. of 32 children still had 1/100 unit or more per c.cm. of blood-serum in contrast to but 22 per cent. retaining this level in a group of 36 children who had been given one dose of alum-precipitated toxoid. At a two-year period the percentages showing 1/100 unit or more of antitoxin are 86 and 15 for those given three doses of unmodified toxoid and one dose of alum-precipitated respectively. The numbers of children in this comparison are not great, but the difference is far beyond chance variation.

GRADUAL DECLINE IN ANTITOXIN CONTENT AFTER VACCINATION

It is gratifying to learn from Fig. 2 that the antitoxin content induced by three doses of toxoid is fully comparable and indeed slightly above that found in a sample of naturally immune persons. But it is as important, though less pleasant, to realise that as time passes after immunisation, the level of antitoxin tends to fall. Fraser and Halpern (1937) have done serial antitoxin titrations of the blood at various time intervals in a large group of children given three doses of toxoid. Their results are summarised in Table V.

It is obvious that antitoxin is being lost by the group as a whole, the percentages in the higher antitoxin categories becoming successively smaller. The rate of loss, however, becomes less rapid as time passes. At the two-year interval the average antitoxin content of the group as a whole is approximately 50 per cent. of the former level. It will be realised that marked variations in the rate of loss of antitoxin will be found among individuals and that the rate may be changed significantly by the amount of diphtheria in the environment. In certain instances, if such chance contact with diphtheria bacilli be sufficient, the antitoxin may be increased, as shown by Fraser and Halpern. It must be pointed out that the results shown in Table V were obtained from the titrations of blood-sera of children living in an environment almost free from diphtheria. Only

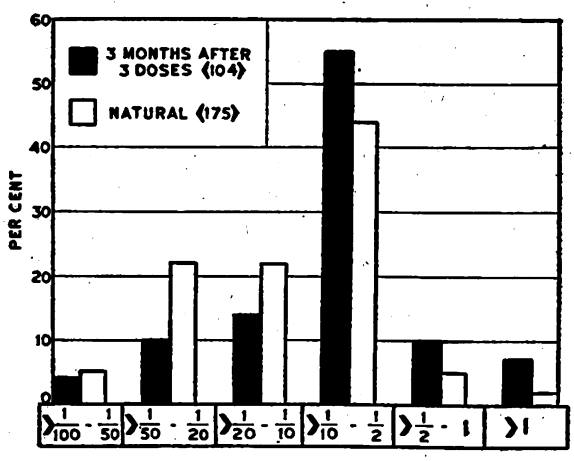

FIG. 2.—Antitoxin content of blood.

in five instances was there evidence of increase in antitoxin content during the time of observation.

In a word, from the data quoted, it can be said that three doses of toxoid yield a higher level of antitoxin response and thus more durable antitoxic immunity than any other procedure compared to date; that the level induced by three doses of antitoxin is fully comparable with that found in natural immunes, but that this level tends to fall as the years pass following immunisation.

TABLE V—DIPHTHERIA ANTITOXIN AT INTERVALS AFTER THREE DOSES OF TOXOID

(629 sera of 244 children)

Interval after toxoid (months).	Number tested.	Percentage distribution by antitoxin levels.										
		<1/500	>1/250 to 1/250	>1/250 to 1/100	>1/100 to 1/50	>1/50 to 1/20	>1/20- to 1/10	>1/10 to 1/5	>1/5 to 1/2	>1/2 to 1	>1 to 2	>2
3	108	1	..	3	4	9	14	30	23	9	6	1
6	103	..	..	2	6	14	17	26	24	6	4	1
9	100	..	..	5	5	15	20	28	18	3	4	2
12	88	..	..	6	7	18	24	25	16	2	1	1
18	103	..	1	8	10	19	24	26	7	2	1	2
24	104	..	2	7	12	25	24	17	8	2	..	3
36	23	..	..	4	13	13	44	9	13	..	..	4

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PROTECTION AGAINST DIPHTHERIA AFFORDED BY TOXOID

It is pertinent now to inquire into the actual value of toxoid in protecting children against diphtheria. For this purpose we have the amount of the diphtheria that occurred in children given one, two, and three doses of toxoid, in comparison with the diphtheria in their school-mates in Toronto public schools under the same exposure, as shown in Table VI (Ross and McKinnon 1931).

These observations were made when diphtheria was still very prevalent and represent therefore the results under conditions of high exposure. The group numbered over 27,000 children, while the controls

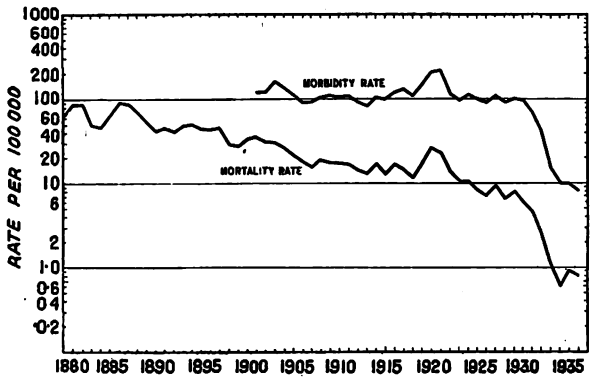

FIG. 3.—Diphtheria in Ontario, 1880–1936. (Morbidity- and mortality-rates per 100,000.)

were the balance of the school population, approximately 90,000. The inadequacy of one dose is at once apparent. The advantage of a second dose in immunisation is evident in the greater reduction (74 per cent.) of diphtheria in those given two doses of toxoid. The superiority of three doses is evident in the 90 per cent. reduction of cases in the 16,829 children given three doses of toxoid in the 1927–30

TABLE VI—REDUCTION IN DIPHTHERIA IN SCHOOL-CHILDREN SUBSEQUENT TO TOXOID

Toronto Public Schools, 1926–30

Doses of toxoid.	Cases.		Percentage reduction.	Deaths.
	Estimated.*	Actual.		
One dose ..	34	24	29	3
Two doses ..	200	52	74	2
Three „ ..	222	23	90	0

* At rate in controls (school-mates) under same exposure, corrected for age, &c.

period. The difference in the results of two doses and three doses is beyond chance variation and is statistically significant. Further, and of importance, this difference is in general agreement with the difference in antitoxin responses induced by two or three doses of toxoid.

These observations were extended to include other school-children given three doses of toxoid subsequent to 1930, making a total of 46,000, with the results shown in Table VII (McKinnon and Ross 1935). In each year the reduction in diphtheria in the group given three doses of toxoid approximated 90 per cent. In other words, this group suffered but 10 per cent. of the rate of diphtheria suffered by their seat-mate controls. The study suggested, however,

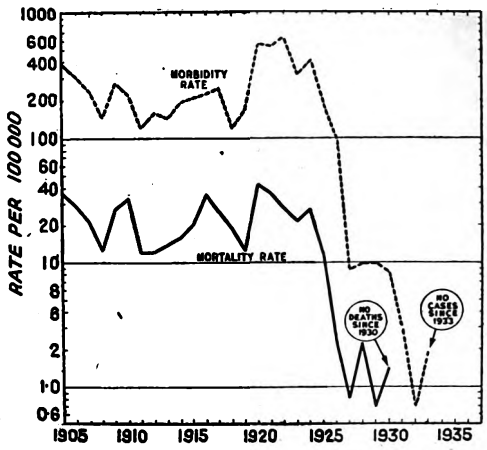

FIG. 4.—Morbidity and mortality from diphtheria in Hamilton, 1905–36.

that as time passed after vaccination there was some falling off in the degree of protection. This is entirely in keeping with the falling off in antitoxin content as shown by Fraser and Halpern and is additional evidence that immunity to diphtheria is a function of antitoxin. As is shown in Figs. 4 and 5, subsequent to 1932 the paucity of diphtheria in Toronto yielded figures so small that deductions from them in regard to protection afforded by toxoid to vaccinated individuals were impractical.

CONTROL OF DIPHTHERIA MORBIDITY AND MORTALITY

Gratifying as is the 90 per cent. reduction in diphtheria in those given three doses of toxoid, as compared with their unvaccinated school-mates, the

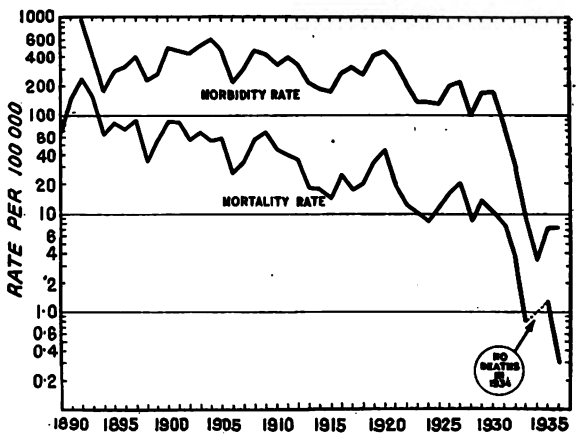

FIG. 5.—Morbidity and mortality from diphtheria in Toronto, 1890–1936.

actual benefit is not confined to those vaccinated, but is reflected in a reduction in diphtheria among their associates.

From 1925 to 1936 inclusive, sufficient toxoid has been distributed from the Connaught Laboratories for the immunisation of over three million persons in Canada. It is not known precisely how much has been used, but the effect is evident in the strikingly lower rates of diphtheria morbidity and mortality in various cities and provinces in Canada. Figs. 3 to 6 are illustrative.

In Table VIII and Fig. 3 the history of diphtheria in the province of Ontario is briefly recorded. The

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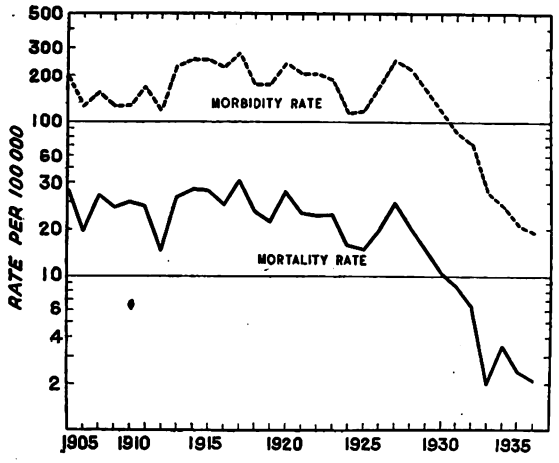

FIG. 6.—Morbidity and mortality from diphtheria in Montreal, 1906–36.

population has increased from under two million in 1880 to over three and one-half million in 1936. In 1916 the Provincial Board of Health of Ontario provided for completely free distribution of diphtheria antitoxin. There were available at the time, for physicians in Ontario, very satisfactory public health diagnostic laboratory facilities to aid in the diagnosis of diphtheria. Thus for more than three millions of persons the scientific weapons available twenty years ago, for the prevention and treatment of diphtheria, were readily accessible. Furthermore, physicians and the general public were repeatedly urged to take advantage of these facilities. Despite that fact, as has already been indicated, the free use of diphtheria antitoxin, while it may have influenced diphtheria mortality and case-fatality rates, showed little or no effect on the absolute volume of recorded

TABLE VII—REDUCTION IN DIPHTHERIA IN CHILDREN GIVEN THREE DOSES OF TOXOID

Toronto Public Schools, 1927–32

Year.	Cases.		Percentage reduction.	Deaths.
	Estimated.*	Actual.		
1927–28 ..	25	1	96	0
1928–29 ..	84	7	92	0
1929–30 ..	113	15	87	0
1930–31 ..	133	14	89	0
1931–32 ..	105	3	97	0
1927–32 ..	460	40	91	0†

* At rates in controls under the same exposure, corrected for age, &c.

† To the end of December, 1937, there has been but one death from diphtheria in any child given three doses of toxoid in Toronto. This occurred in September, 1935, in a child 6½ years old, who had been given three doses of toxoid 5 years previously.

diphtheria morbidity, and the essential lack of control of the disease is seen in the return to the high mortality-rate of over 25 per 100,000 in 1920 and in the sustained high level of recorded morbidity, even after allowing for changing influences, for nearly thirty years. Then there is a precipitous decline such as had not occurred in the previous thirty years for which morbidity records are available, or in the previous fifty years for which mortality records are shown. From a rate of 97 in 1930, morbidity fell to 10 per 100,000 in 1934, and from a rate of 6 per 100,000 in 1930—the lowest on record till that date—mortality fell to 0·6 per 100,000 in 1934. This change has followed the extensive use of toxoid. The abruptness of the change in the picture, coupled with the established efficiency of toxoid, leaves no room for doubt that the change is due to active immunisation. Any other hypothesis to explain the change is superfluous. The fact that diphtheria has declined proportionately more than might have been anticipated from the number given toxoid is not difficult of explanation. Reducing cases in the immunised

TABLE VIII—DIPHTHERIA—ONTARIO. 1880–1936

Year.	Deaths.	Mortality-rate.*	Year.	Cases.	Deaths.	Mortality-rate.*	Morbidity-rate.*	Case-fatality rate.†
1880	1251	66·0	1901	2627	772	35·4	120	29·4
1881	1704	88·4	1902	2696	676	30·5	122	25·1
1882	1708	87·8	1903	3599	687	30·5	160	19·1
1883	976	49·7	1904	3045	608	26·6	133	20·0
1884	929	46·8	1905	2641	503	21·7	114	19·1
1885	1282	64·0	1906	2116	423	18·0	90	20·0
1886	1833	90·7	1907	2172	380	15·9	91	17·5
1887	1786	87·6	1908	2477	450	18·6	102	18·2
1888	1459	70·9	1909	2635	430	17·5	107	16·3
1889	1101	53·0	1910	2559	435	17·5	103	17·0
1890	893	42·6	1911	2631	423	16·7	104	16·1
1891	952	45·0	1912	2340	371	14·4	91	15·8
1892	890	41·9	1913	2194	339	13·0	84	15·4
1893	1044	49·1	1914	2772	443	16·7	105	16·0
1894	1075	50·3	1915	2719	341	12·7	101	12·5
1895	942	44·0	1916	3212	461	16·9	118	14·3
1896	925	43·1	1917	3590	396	14·3	129	11·0
1897	976	45·3	1918	3093	335	11·9	110	10·8
1898	634	29·3	1919	4261	475	16·7	149	11·1
1899	599	27·6	1920	5940	745	25·7	205	12·5
1900	738	33·9	1921	6313	653	22·3	215	10·3
			1922	3529	411	13·8	118	11·6
			1923	2935	316	10·4	97	10·8
			1924	3473	322	10·5	113	9·3
			1925	3031	251	8·1	98	8·3
			1926	2818	227	7·2	90	8·1
			1927	3346	297	9·3	105	8·9
			1928	3918	213	6·6	90	7·3
			1929	3261	262	8·0	100	8·0
			1930	3198	202	6·1	97	6·3
			1931	2368	157	4·6	69	6·6
			1932	1496	89	2·6	43	5·9
			1933	529	40	1·1	15	7·6
			1934	371	23	0·6	10	6·2
			1935	361	33	0·9	10	9·1
			1936	290	31	0·8	8	10·7

* Per 100,000. † Per 100 cases.

reduces foci of infection, spreaders of disease, in the group as a whole, so that the non-immunised benefit indirectly; this makes the control of diphtheria eminently practical. Further evidence of this is presented later in this paper.

Hamilton, Ontario, a city of 150,000 population, was the first city of that size in Canada to control effectively diphtheria (Roberts 1931). The achievement of Dr. James Roberts, medical officer of health of Hamilton, has been a fine incentive to others. The record of this control is shown in Fig. 4. There have been no deaths since 1930 and no cases since 1933. This record speaks for itself.

Fig. 5 shows the history of diphtheria in Toronto, Canada, a city of approximately 650,000 population. Since 1926, 104,000 children have been given three doses of toxoid by physicians of the Department of Public Health. It is estimated that 13,000 children have been given toxoid by their own physicians. The effect of this continued immunisation is shown in the abrupt change in diphtheria, the morbidity-rate falling from 164 per 100,000 in 1930 to 3·5 in 1934. In pre-toxoid years the annual toll was 45 to 98 deaths, an average of 65 from 1921 to 1925. For a period of fifteen months, from January, 1934, to

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March, 1935, not one death from diphtheria occurred in the city.†

The records of smaller cities, for example Brantford, Ontario, and St. Catharines, Ontario, show even more satisfactory control of the disease. Extracts from the annual reports for 1936 of the medical officers of health, Dr. W. L. Hutton of Brantford, and Dr. D. V. Currey of St. Catharines, are self-explanatory.

TABLE IX—DIPHTHERIA, TORONTO

Year.	Cases.	Deaths.	Number examined.	Positive swabs.	Summation of persons immunised.
1926	1,098	90	13,231	2,564	..
1927	1,223	114	12,286	1,661	80
1928	593	50	9,354	827	12,492
1929	1,030	82	16,542	2,754	17,564
1930	1,085	66	13,501	2,109	18,954
1931	564	49	9,728	1,086	35,280
1932	180	22	6,760	258	57,890
1933	58	5	5,077	86	72,367
1934	22	0	4,516	28	85,870
1935	46	8	4,322	56	92,918
1936	48	2	4,307	80	104,449

Population { 1926 .. 556,691 ; 1936 .. 645,462

Brantford, Ontario (population in 1936 : 31,382).—"The policy of offering free toxoid treatments for the prevention of diphtheria continues to keep this city free from diphtheria. No Brantford child has suffered from this disease since Nov. 18th, 1930."

St. Catharines, Ontario (population in 1936 : 27,000).—"It is over eight years since one of our residents died from diphtheria."

Montreal, Quebec, a city of nearly 1,000,000 population, has experienced a similar decline in diphtheria following the extensive use of toxoid, as shown in Fig. 6.

Fig. 7 is given to show that every province of Canada has shared, though not equally, in the decline in diphtheria following the use of toxoid.

REDUCTION IN THE INCIDENCE OF CARRIERS

It has been suggested that specific immunisation against diphtheria may occasion an increase in the carrier-rate of virulent diphtheria bacilli in any community. Deadman and Elliott (1933) showed that the experience in Hamilton, Ontario, was not at all in conformity with this suggestion. In 1920, 8261 cultures were examined for the diphtheria bacillus in Deadman's laboratory; 1040 were positive. In 1921, 9645 were examined and 1234 were positive. These data were typical of that time, In 1932, 3929 were examined and 85 (from 12 individuals) were positive. In 1934, out of 3817 examined, none were positive. Again in 1936, out of 3949 examined, none were positive.

† In the calendar year 1937, for the second time, no diphtheria death was reported in Toronto.

From May, 1934, to June, 1936, surveys were made in Toronto in which approximately 7800 nose and throat cultures from the school-children were examined (Fraser and Halpern 1937). Only 4 were found to contain virulent diphtheria bacilli. In another group of 999 children in an adjacent municipality, partly urban and partly rural, only 2 diphtheria carriers were discovered. In surveys of 1774 school-children in Montreal in 1935–37, only 2 carriers were detected. Table IX shows the numbers of positive cultures found in routine work in the laboratories of the Department of Public Health in Toronto. It is evident that in spite of a much greater number of cultures examined in relationship to the number of cases and a much more diligent search of the population, the number of carriers found showed very striking reductions. There is thus no evidence in these data in support of the suggestion that immunisation of part of a community increases the hazard of diphtheria.

SUMMARY AND CONCLUSIONS

Prior to the use of toxoid there was no effectual control of diphtheria in Canada. In spite of the free distribution of antitoxin for prevention as well as treatment, recorded diphtheria morbidity persisted at its previous high levels, and mortality, though falling, still presented one of the most important public health problems.

The reaction test, as devised by Moloney, practically obviated the hazard of reactions and thus facilitated the wide use of toxoid.

Requirements for the Schick test are in need of revision and standardisation. It is not infallible and its limitations should be recognised.

For determining the antigenicity of and differentiating between prophylactics the Schick test may be of little value. Antitoxin titrations give more complete and reliable information.

Titrations of the blood-serum of children who initially had no antitoxin and were then submitted to various immunisation procedures show that three

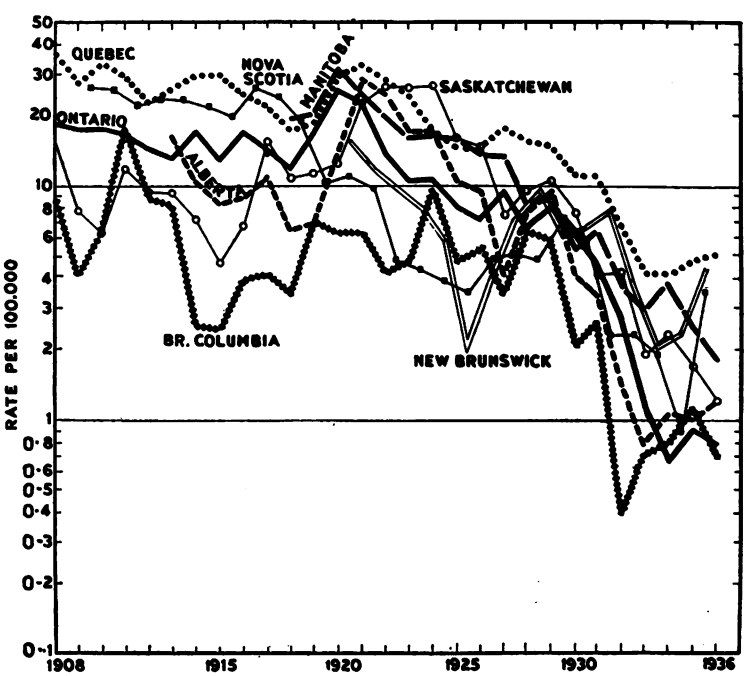

FIG. 7.—Diphtheria mortality-rate in provinces of Canada, 1908–36.

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doses of unmodified diphtheria toxoid induced a higher antitoxin response than any of the other procedures compared—namely, two doses of unmodified diphtheria toxoid, one dose of alum-precipitated toxoid, and two doses of alum-precipitated toxoid. Titrations of blood-serum of vaccinated children indicate a loss in antitoxin as time passes.

Field studies show that the reduction in diphtheria, in those vaccinated with two doses of toxoid, is, like the antitoxin response, less than the reduction in those vaccinated with three doses and that the diphtheria occurring in the latter group is reduced by approximately 90 per cent. as compared with that found in school-mates under the same exposure.

Records show striking declines in diphtheria morbidity and mortality and in the incidence of carriers in various cities and provinces in Canada following the wide use of toxoid.

The abruptness of this decline in diphtheria morbidity and mortality and in the incidence of diphtheria-carriers in Canada following the extensive use of toxoid, the absence of any comparable diminution in the number of cases or of deaths from diphtheria before the use of toxoid, and the demonstrated efficiency of toxoid in preventing diphtheria in those vaccinated leave no doubt that the decline is due to immunisation.

The extent of the decline in several of the large cities and in certain of the provinces of Canada shows indubitably that diphtheria is a preventable disease.

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MEDICINE AND THE LAW

Borrowing a Doctor's Name

THE disability which prevents an unqualified practitioner from signing certificates sometimes forces his hand and drives him into illegality. In a case at the Marylebone police-court on Jan. 21st it appeared that William Thomas Robertson, a chemist's assistant, known in the district as "Dr." Robertson, had attended patients and, amongst other instances, had been called in to treat a child suspected of having diphtheria. One of his patients, whom he treated for influenza, was a civil servant. The patient asked for a medical certificate to send to the head of his department. Robertson then sent a certificate signed "A. C. Livingstone, F.R.C.S., L.R.C.S. (Edinburgh), and L.F.S." Whether Robertson had deliberately adopted the name of a registered medical practitioner or not, inquiry showed that there was a Dr. Livingston but that the spelling and degrees on the medical certificate did not correspond with those of the doctor in the Medical Register. Robertson was summoned for falsely pretending to be a doctor. He pleaded guilty and was fined £10 with £2 2*s*. costs. The defendant was not even a qualified chemist and druggist, having failed in the examination. Giving evidence on his own behalf, he stated in mitigation that at any rate he had never charged anybody a fee.

Deaths in Maternity Home

The Surrey county council reviewed last week the circumstances of the death of two maternity patients from puerperal fever at the Melrose Nursing Home, Sutton. An account of the inquest and of the criticisms contained in the jury's riders was printed in this column on Jan. 15th (p. 157). The maternity and child welfare subcommittee interviewed the council's deputy inspector of midwives, Miss Mander, and exonerated her from all blame. The subcommittee found that Miss I. L. Gibson, the keeper of the home, was at fault in the following specific points. First, she was to blame in allowing patients to enter the home without previous warning to them or to their doctors of the existence of a case of puerperal pyrexia in the home. Secondly, she failed in her duty as a midwife to notify the council that she had been in contact with infection. Thirdly, she omitted to disclose to the deputy inspector of midwives the fact that puerperal pyrexia had occurred. Fourthly, she allowed the night nurse to attend several patients, some of whom were suffering from puerperal pyrexia. On these findings the public health committee recommended, and the county council approved, the cancelling of Miss Gibson's registration. The council also approved a recommendation that the failure of the doctor in attendance on one of the patients to notify the Sutton and Cheam borough council of the occurrence of a case of puerperal pyrexia at the home should be drawn to the borough council's attention.

The case is one of a series which indicates the need of drastic overhaul and close supervision of the arrangements in maternity homes.

IRELAND

(FROM OUR OWN CORRESPONDENT)

DEFENCE OF THE VOLUNTARY HOSPITAL

IF one may judge from the speeches at the charter day dinner of the Royal College of Surgeons last Saturday, following on the address by Prof. Henry Moore, to which I referred a fortnight ago, the anxiety of those connected with the voluntary hospitals in Ireland is increasing rather than diminishing. Some two and a half years ago the Hospitals Commission, the body appointed by the Minister of Local Government and Public Health to advise him in regard to the distribution of the Sweepstakes Funds, advised, inter alia, that there should be four modern hospitals of 500 to 600 beds each established in Dublin. These hospitals were to be got by the separate development of three of the larger hospitals and by the amalgamation with one of them of the smaller. Last spring, speaking in the Dáil, the Minister declared that the voluntary hospitals "had, especially and in all justice, a right to primary consideration when distributing the Hospitals Sweepstakes Funds." During the last year or two, however, a rival scheme has been put forward mainly by certain members of the local authorities, who declare that the necessary funds should be supplied from the Sweepstakes Funds to establish a municipal hospital. The decision of the Minister between these two

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alternatives has been so long delayed that those interested in the voluntary hospitals have become anxious.

Last Saturday, in replying to the toast of the Royal College of Surgeons in Ireland, the president, Mr. A. A. McConnell, discussed the subject at some length as one of great importance to the College, the profession, and the public. He asked to whom should the grant be given? To the voluntary hospital authorities, who had founded and managed the existing hospitals, kept them equipped with up-to-date apparatus, and turned out doctors second to none in the world; or to the municipal authorities, who had never run a modern hospital and had never tried to run a modern hospital? There had been a local authority's hospital in Dublin for many years, he said. Why was it not the best in the city? He suggested it was because the municipal authorities only thought it of importance when they thought they could get the money given to them. Why did the voluntary hospitals want to be enlarged—why did they oppose a municipal hospital? The members of the staffs would have to do more work, they would get not a penny for it, and they would submit to what every medical man hates like the devil—some degree of departmental control. But they believed that the future of medicine, the future of the universities, the future of the colleges, and the future of the sick poor in the city largely depended on Dublin having her hospitals run by people who would run them for the love of it and who were not engaged in running multitudes of other activities and institutions.

Dr. Robert J. Rowlette, who proposed the toast of the College, was equally emphatic. He said that the voluntary hospitals were quite content to go on giving gratuitous treatment to the poor, provided the bare maintenance charges were met. There was no proposal to pay the visiting staff. On the other hand, a hospital dependent on the rates had to pay for medical attendance as well as maintenance. The advantages of the voluntary system, however, were deeper than matters of pounds, shillings, and pence. They were, in brief, efficiency, progress, encouragement of research, opportunities for education, and, above all, the best individual attention to the patient given freely by the leading physicians and surgeons of the country. He would be content to leave to any working man in Dublin the choice between treatment in a voluntary hospital and in a public hospital under the charge of a public authority. The choice, in Dr. Rowlette's opinion, is between progress and stagnation.

In its first leading article the *Irish Times* of last Monday remarks that it is high time that public opinion in Ireland should be mobilised in favour of the voluntary hospitals, which are among our people's most valued possessions. It is to be hoped that these clear expressions of professional and public opinion will have their effect on the mind of the authorities.

NOMINATING BODIES FOR THE SENATE PANELS

The constitution of the new Senate of Ireland contemplates election from certain vocational panels, and the right of nominating to these panels was to be conferred on bodies regarded as having a certain vocational authority. The list of approved bodies was published last week and has caused a good deal of comment. It is difficult to discuss the principle which underlies the selection. Certain medical bodies applied for registration, but the only one the claim of which is admitted is the Royal College of Surgeons in Ireland. It has been admitted to registration for the "cultural and educational panel," while the applications of the Royal College of Physicians of Ireland, the Royal Academy of Medicine, and the Irish Medical Union—the representative body of the medical profession of the country and comprising some 70 or 80 per cent. of its members—have been rejected. It is understood that the Irish Medical Registration Council did not apply for registration, believing that its entrance into political matters was undesirable. On the other hand, the Dental Board, with similar functions, applied for and was granted registration. As the universities have direct representation in the Senate they did not apply for registration as nominating bodies.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

MIDWIFERY AT DUNDEE

Prof. John McGibbon retired from the chair of gynæcology and midwifery at Dundee in 1936. There has been some concern about the appointment of a new professor, for it seems that the university court and the town council have been in consultation together regarding the possibility of transferring the activity of the new professor from the Dundee Royal Infirmary to the municipal hospital at Maryfield. The Dundee Royal Infirmary, however, is the centre of maternity teaching in the district and about half the births in the city are annually attended there. Last year the births numbered 1115 indoor and 544 outdoor, and the proposal to transfer the new professor to Maryfield is, therefore, in some quarters looked on as an attempt by the town council and the university court to develop a new maternity centre not only under their own control but to some extent at the expense of the Dundee Royal Infirmary.

In Scotland, as elsewhere, there is an unfortunate rivalry between municipal and voluntary hospitals and in some instances the municipal authorities have enlisted the support of the local university authorities to improve the status of their hospitals. The result in some instances has been that the university authorities have appeared to take more interest in municipal hospitals than in the old-established voluntary hospitals that are still the centre of medical teaching. It is well known, however, that the management of the voluntary hospitals is of a standard that can hardly be improved on. It seems to the onlooker deplorable that any body should adopt an attitude or a policy that in any way could handicap the valuable work that the old-established institutions are doing.

Doubt has often been expressed as to whether municipal authorities constitute the most suitable body for controlling the non-voluntary hospitals. The most comprehensive and successful medical service in Britain, if not in the world, is the Highlands and Islands medical service. It is managed to the complete satisfaction of the medical men who take a part in it, and this service is quite independent of the local municipal authorities. In fact those who play a part in the service are more than anxious to avoid any interference by the local municipal bodies.

HIGHLANDS AND ISLANDS MEDICAL SERVICE

At a meeting of the Edinburgh Medico-Chirurgical Society last week Dr. Alexander Shearer described the remarkable and comprehensive Highlands and Islands medical service with whose development he has been closely related. He explained how the scheme

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enabled the humblest home in any part of these districts to obtain medical attention at the low uniform fee of 5*s.* for the first visit and 3*s.* 6*d.* for subsequent attendances. The doctor often has to travel great distances, but the aim of the scheme is to relieve the patient of paying for the expense and time involved by the difficulties of transport. A grant of £42,000 is made annually by Parliament to the fund of the medical service and in 1929 it included 155 doctors and 210 nurses under the scheme. Provision for specialist services has also been arranged, and fully qualified surgeons are appointed to work at the various hospitals that have been built. Recently a consulting physician has been appointed to the Northern Infirmary, Inverness; and an air ambulance service and wireless telephony have enabled the removal of seriously ill patients to hospital from isolated districts and islands. The scheme has also made it possible for doctors to make a reasonable income in districts that previously were unable to support any form of medical service. The striking success of the Highlands and Islands medical service has resulted in many other countries studying it, and similar services have been formed not only in the United States but also in India. The recent report by the committee on the Scottish health services states that "Our view of the Highlands and Islands medical service is that it has fully justified its existence and has returned full value for the cost. In our view it has brought great benefit to the people of the Highlands and Islands and is administered in an atmosphere of sympathy and interest between the central board and the doctors, nurses, and other parties, to the satisfaction of all concerned."

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

A FEDERAL HEALTH DEPARTMENT

THE expediency of establishing a department of health is now before Congress. It has been urged by American physicians since 1875 that such a unit should be set up, with a secretary at its head and a voice in the cabinet. The exercise of authority in the field of health has given rise to an extensive and powerful group of federal health services, scattered throughout the executive departments and independent agencies of the Government, without integration and without a common directing head, and spending every year, it is estimated, more than a hundred million dollars. Several governmental committees have recently been appointed to study the activities of the various departments, bureaux, and boards of the executive branch of the Government to determine whether they conflict with or overlap others, and to recommend coördination of interests. The President's committee on administrative management now proposes to create a department of social welfare as a means of bringing under one head these widespread interests. The board of trustees of the American Medical Association at its meeting early last year recommended the consolidation in a single department of all medical and health activities of the Government, under the supervision and direction of a competently trained physician, experienced in executive administration. The department of welfare proposed by the committee on administrative management, however, cannot fulfil the recommendations of the medical profession, in that it would necessarily have such diverse interests as (1) the public health, safety, and sanitation, (2) the protection of the consumer, (3) the cause of education, (4) the relief of unemployment and of the hardship and suffering caused thereby, (5) the relief of the needy and distressed and the assistance of the aged, (6) the relief and vocational rehabilitation of the physically disabled, and (7) in general the coördination and promotion of public health, education, and welfare activities. Federal interest in the public health, as measured by money expended annually, exceeds its interest in commerce, justice, labour, and affairs of State, all combined. Hence to organise the health activities of the Government into a mere section of a department, created for that purpose but interested in many and varied other activities, would only hamper the development of federal activities in the field of health and delay the organisation of a proper federal agency. The bureau of legal medicine and legislation of the American Medical Association, in its study of this question, says: "As between assembling health activities in the proposed composite Department of Welfare and assembling them in an existing department, the latter course would be preferable, for it would be less likely to retard the development of the organization that must ultimately result, a Department of Health with a secretary in the cabinet."

FUNDS FOR POLIOMYELITIS CAMPAIGN

The National Foundation for Infantile Paralysis recently set up by President Roosevelt initiated a nation-wide campaign on Jan. 17th, which ended with the fifth annual celebration of the President's birthday on Jan. 29th. The first birthday ball in 1934 yielded just over a million dollars, all of which went to the Georgia Warm Springs Foundation. In the next three years 70 per cent. of the funds were retained by local communities for infantile paralysis work, and the remainder went to research. No definite goal has been set for the 1938 campaign, but a "founder's plan" hopes to enrol two million persons at a dollar each. This year all the money will be turned over to the new foundation and will be used in four types of activities: for scientific research on the disease; for emergency aid in epidemics; for after-care of victims; and for allotments to orthopædic centres, hospitals, and clinics for specific programmes within individual communities.

BIRTHS AND DEATHS

The balance of the birth-rate over the death-rate in the United States will be a trifle more favourable this year than in 1936, according to the statistical bulletin of the Metropolitan Life Insurance Company. This is not due, however, to an increase in the birth-rate, which was approximately 16·5 per 1000 population for both years, but rather to a decline in death-rate from 11·7 per 1000 in 1936 to 11·5 in 1937. The true significance of our declining birth-rate can be understood only by a study of the degree to which women of different ages and births of successive orders of children are involved. Computations by the same company's statistical bureau compare the periods from 1920–24 and 1930–34. In the age-group 15–19 the rate of reproduction fell from 4503 per 100,000 to 4168, a drop of 7·4 per cent. In each of the next three age-groups, 20–24, 25–29, and 30–34, the rate of reproduction declined even more sharply, with drops of 18·0, 25·1, and 29·6 per cent. respectively. The age-group table shows a birth-rate progressively declining among older women. It is noted that the gross reproduction-rate for first children declined the least, the figures being 76,695

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in the earlier period and 65,090 in 1930–34. For subsequent orders of children up to the fifth the percentage decline assumed a rapidly increasing importance, the figures for the second, third, and fourth orders of birth being 19·2, 25·5, and 30·0 per cent. respectively. The data presented in the two tables are necessarily related. Children of the higher orders of birth are born, on the average, of mothers whose ages lie toward the end of the reproductive period. Thus the declining birth-rate in the United States is due not so much to general reduction in the reproductive rate of women as to the limitation of families, whereby children of higher orders of birth are rendered more scarce, and the birth of American children tends to take place in increasing proportion among relatively younger women.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A HOSPITAL PHYSICIAN

II

OPPOSITION to the development of national or municipal services is not by any means confined to the medical profession. The extended use of hospitals has meant a rapid increase in expenditure, and the bill for new buildings and equipment has been met by pressing into service quite an appreciable proportion of the whole population as collectors by means of flag-days, special appeals, organised lotteries and competitions, and contributory schemes. There have been curious episodes in the campaign, and a few open scandals, which have alienated sentiment, already a little strained by too fervid and constant stimulation. But the system has created a vast body of people, both humble and exalted, who are accustomed to devote a good deal of their energy and leisure to this one purpose—many of whom, indeed, make it one of their main interests in life.

Of the larger donations it has been cruelly said that the rich would be at a loss to know where to bestow their fortunes, regarded with a covetous eye by the Chancellor of the Exchequer, if hospitals ceased to be objects of charity. Charity is the noblest of virtues, and it is perhaps straining its boundaries to include the signing of cheques and bestowing of legacies for sums the loss of which has no effect on the daily lives of the benefactors. A not very healthy sense of proprietorship and patronage is created.

Various categories of supporters combine to form a strong interest vested in the maintenance and protection of voluntary hospitals and their corollary, private specialist practice; but in fairness one must distinguish between those who, perhaps too uncritical, aim solely at an ideal, and those who jealously oppose any attempt to augment the service offered to the sick by providing hospital services through public authority.

Nobody claims, of course, that the voluntary hospitals supply the entire needs of the poor; nor does anyone raise any objection to the public institutions which care for the aged, for the chronic sick, for mental disease and deficiency, and for the acute infectious and other special categories of disease. It is the development of general hospitals for acute illness by government authority that is so much disliked and the projected provision of extended domiciliary medical service. The Poor-law Commission of 1909 even stated in its report that "there was a danger (sic) of the infirmaries being regarded as State hospitals."

The argument advanced is that, in this field, the voluntary hospitals are, by the nature of their organisation, paramount, adequately fulfilling the needs of the poor and giving them, it is even claimed, a service superior to that obtainable by any except the very rich. Dr. McCurrich, by no means uncritical of the voluntary hospital system, yet gives a somewhat extravagant expression to this point of view. "There is no limit," he says, "to the number of hospitals that a patient may visit, and in this way he may consult a large number of eminent specialists about his condition, and note whether they agree or disagree, and thus obtain a very valuable average opinion, a method quite beyond the reach of most paying patients." Another interpretation, one fears, not wholly adulatory, might be placed upon the need for such an excursion.

* * *

In the work of our hospitals there are, in fact, grounds for admiration and also for criticism, and for the most part both blame and praise are due, in respect of the same factors, to almost all hospitals whether charitable or rate-aided. There are, however, certain factors peculiar to each which must be assessed before one can survey the hospital service as a whole and estimate the extent to which it uses the resources which research has made available, furthers research itself, and mitigates the suffering in illness which poverty so abundantly causes.

* * *

The London Hospital in 1933 admitted some 14,000 patients, but over 100,000 were examined as out-patients. The doors of the voluntary hospitals are open to all, and no patient is refused examination; but there is no guarantee of admission to the wards, however grave the need. This fact is merely a reflection of finance, since the maintenance cost of each bed is round about £200 per annum; the out-patient clinics, relatively inexpensive to maintain, can deal with the very large number attracted by the hospital's reputation, but only a portion of patients examined, whose illness demands admission to hospital, can be given beds there.

This disproportion between in-patient and out-patient facilities represents almost daily hardship; the sympathetic help of nurses and almoners, given to those who need admission and are refused it, softens but cannot abolish the delay, risk, and expense of transport to another institution. Deaths occurring shortly after transfer from one hospital to another are not infrequently the subject of comment in the coroners' courts. The fact that voluntary hospitals rarely maintain their own ambulance service is an additional disability.

Dr. McCurrich's patient, touring the voluntary hospitals of London to obtain a "valuable average

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opinion" upon the carcinoma of his pylorus, may find them all ready to operate but none able to provide the bed in which he is to recover from the operation. Waiting-lists, which may extend to several months or even years for the less urgent cases, are really inexcusable; they have been known to lead to patients being transferred from the operable to the inoperable category by the mere extension of a disease process, and the relief felt by the person responsible for arranging admissions when he learns that patients have undergone spontaneous recovery in the interval may have its counterpart in weeks of unnecessary suffering.

The scramble for priority of admission leads to a selection of cases of which the hospital's clients are unaware. Other things being equal, the patient with what might be called a short-term illness is given preference, but the medical interest of the moment, and the apparent suitability of the disease for students' instruction, are also factors of importance, and Dr. McCurrich is not the first to call attention to the existence of what is really an indirect premium payment for priority, in the desire of a consultant, who has received a fee as "second opinion" in private practice, to satisfy patient and general practitioner by expediting admission to hospital. Similar pressure is exercised when the patient's interests are supported by individuals or societies who contribute to the hospital's funds.

Dearth of ready money is responsible for many other deficiencies that rob the voluntary hospital of any title to be regarded as a complete unit. The specially qualified hospital almoner is chiefly occupied in securing for patients help from a multiplicity of charitable sources for the expenses of treatment which the hospital advises but is unable to provide. It is even the practice at one large teaching hospital in London to refuse admission to "destitute" cases (i.e., those in receipt of public assistance) and to unmarried mothers, because the expense of their subsequent convalescence and "social care" is considered prohibitive. Sir Arthur Newsholme in his "International Studies" (1931) notes "the essential fact that hospitals have ceased in large measure to be charitable institutions."

* * *

The work of voluntary hospitals differs so much from one institution to another that generalisations are unjustifiable. Connexion with a medical school is not an absolute guarantee of efficiency. Senior staff appointments to fill vacancies are made on the recommendation of the existing staff, who may generally be relied upon to recommend suitable candidates. But nepotism undoubtedly often influences choice; insularity and selfish conservatism may prevent the fullest use being made of the opportunities. An additional staff appointment means another permanent competitor for fees, and the financial heyday of consulting practice has long since passed. This competition is often the basis of the lamentable jealousy so often apparent between members of the honorary staffs of voluntary hospitals, which may lead to a complete absence of coöperation between two sections of a hospital, and is always inimical to research.

The output of valuable research work by clinicians in voluntary hospitals is now in fact not great; capacity for such work, which is not widely distributed, is not considered an important recommendation for appointment, and the obligations of private practice upon a man who has no private means make a voluntary hospital appointment unattractive to those whose primary interest is research.

Finally, I want to mention one other serious defect (as it seems to me) in the organisation of work in the voluntary hospitals. The number of resident medical officers is usually adequate, but the responsibility allotted to men and women who have just passed out of the schools is often dangerously great. There is a tendency to increase the number of more experienced residents, but it remains the usual practice to lay upon newly qualified residents the onus of making the primary decision as to whether or no a new patient is worthy of serious consideration. This practice is unjust to both patient and doctor, and is often responsible for grave mistakes.

THE SERVICES

Health of the Air Force

THE report of the Director of Medical Services for 1936[1] shows that the expansion of the Royal Air Force and the lowering of the medical standard for recruits has not produced any striking changes in its health. Rejections on medical grounds fell from 46 per cent. in 1935 to 36 per cent. in 1936, and the total strength rose from an average of 32,000 in the period 1928–35 to 48,000, of whom 12,000 were stationed abroad, but though the incidence of sickness increased from 675 to 746 per 1000 this was largely due to chance epidemics of influenza and german measles.

About seven-eighths of the total sickness was due to disease and the other eighth to accident, a proportion that changes very little from year to year. Apart from injuries, infections of the upper air-passages were the commonest causes of disablement, followed by gonorrhœa, skin infections, rubella, acute rheumatism, and appendicitis. The incidence of tuberculosis was 0·8 per 1000, about the same as the previous year, and was very much higher in foreign than in home stations. Venereal diseases steadily decline, the incidence in 1936 being 9·0 per 1000, the lowest recorded. Illnesses of all kinds were commonest in those under 18 years and became progressively less common up to 40. The sickness incidence abroad, 873 per 1000, was rather higher than at home, and the highest figure, 926 per 1000, was in the Far East, though there were comparatively few cases of tropical disease. There were 181 deaths in the service in 1936; of these 118 were due to injury, a lower figure than in 1935 when 52 men died in the Quetta earthquake. Pneumonia, septicæmia, and digestive diseases were the commonest causes of death.

About a fifth of the 2800 accidents were on duty and about a third of these in actual flying. Organised games, especially football, were responsible for over 1000 injuries, and another 1000 were incurred in motor vehicles, various forms of athletics, and ways unconnected with the Service. Four men were wounded in action in the air, two of whom died, and three were attacked, one in Palestine fatally, by unknown assailants on the ground. Although there were few flying accidents, nearly half of them were fatal—88 in 1936, compared with 40 in 1935—and these accounted for three-quarters of the total accidental deaths.

[1] Report on the Health of the Royal Air Force for 1936. H.M. Stationery Office. Pp. 99. 2s.

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As in previous years the commonest causes of invaliding out were mental diseases, epilepsy, psychoneuroses and other diseases of the nervous system, and tuberculosis, these together accounting for 123 of the total of 264. In addition, 25 recruits were discharged because they were temperamentally unsuitable, many of them having enlisted under the expansion scheme and been unable to adapt themselves to service life.

Parkes Memorial Prize

The Parkes memorial prize for 1937 has been awarded to Major J. Biggam, F.R.C.S., of the Royal Army Medical Corps, for his investigations into the lighting of barracks and other military institutions coupled with his work on the effect on vision of the wearing of the service respirator and for the spectacle frame he has designed to be worn with the respirator.

PANEL AND CONTRACT PRACTICE

Irregular Issue of Prescriptions

Two practitioners who have issued prescriptions to persons not on their lists are to be surcharged 10*s.* 6*d.* and £2 12*s.* 7*d.*—i.e., the cost of the prescriptions. In one case the doctor lives at an hotel and treats the insured resident staff there. It has been his practice to provide treatment for non-resident staff and to issue prescriptions to them, although they are insured persons on the lists of practitioners in the vicinity of their homes. He has made no charge, of course, for the treatment given, but as it was not treatment required by an accident or other sudden emergency, it was improper for him to issue the prescriptions. In the other case the practitioner issued prescriptions to persons whose names had been removed from his list because they were no longer entitled to medical benefit—sometimes as long ago as 1932. He apparently thought that anybody who had been insured and had passed the age of 65 was ipso facto entitled to medical benefit. Actually a person must be insured on reaching pensionable age if title to benefit is to continue throughout life.

The National Formulary

It is sometimes alleged that insurance practitioners are restricted in their prescribing to the preparations contained in the National Formulary, and unfortunately some practitioners have this impression. The fact is that insured persons are entitled to receive all proper and necessary drugs and prescribed appliances, and while the National Formulary contains a list of useful prescriptions there has never been any suggestion that a practitioner is debarred from prescribing whatever he thinks necessary—assuming that he exercises proper professional skill in determining what the patient really needs. A special return has recently been prepared at the request of the Ministry of Health showing the number of times each of the preparations contained in the Formulary occurs in a representative sample of prescriptions. The test covered five metropolitan boroughs and related to the prescriptions issued by 187 practitioners. No account was taken of preparations mentioned in the Formulary as appertaining to the British Pharmacopœia or the British Pharmaceutical Codex or of preparations considered to have been superseded by later formulæ included in the B.P.C. 1934. (It will be remembered that the current edition of the National Formulary was issued in 1933.) It was found that 1851 Formulary preparations—i.e., about 62 per cent.—occurred in the 2975 prescriptions examined.

Expensive Drugs

In principle an insurance doctor has not to consider whether a drug is costly but only whether it is unnecessarily costly. An example of this principle has received some public attention at East Ham where an insured woman suffering from Addison's disease is receiving daily injections of an extract of adrenal cortex at an estimated cost to the insurance fund of some £240 a year. The insurance committee is, we understand, taking the advice of the Ministry of Health in the matter; but the situation is not unique. As long ago as November, 1932, the London committee reported a similar case, and since then there have been others treated with some suprarenal preparation both by injection and by mouth, one of them continuously for more than four years. The crucial question for an insurance committee to decide is whether a preparation equally suitable for the treatment which the practitioner considers desirable could have been ordered at less cost. No particular drug can be prohibited on the ground of cost alone. The general principle was well established in the early days of insulin treatment.

Getting Rid of a Patient

An insured person complained about the treatment provided by his insurance practitioner, but it was clear that the complaint was really made because the doctor refused to certify him as incapable of work. (The fact that another practitioner gave him the certificate he wanted does not affect the situation, for a medical certificate must express the opinion formed by the practitioner making the examination.) The case was a little unusual because the practitioner accused the patient of truculence towards him and the patient accused the practitioner of being offensive. The medical service subcommittee did not have to deal with this aspect of the case, but it is significant that the practitioner, after refusing to issue the certificate of incapacity, demanded the patient's medical card and signed the appropriate part as indicating his consent to an immediate transfer to someone else's list. Such a transfer, however, would only take effect if and when the insured person found another practitioner willing to accept him; and the signing of the form would in no way absolve the original practitioner from his responsibilities. The proper action, since he was no longer issuing certificates of incapacity for the patient, would have been for the practitioner to give notice to the insurance committee of his desire that the patient's name should be removed from his list without arguing with the patient about the card. No reason need have been given, and the removal would have been automatic.

SOCIETY FOR THE PROVISION OF BIRTH CONTROL CLINICS.—A lecture on the theory and practice of contraception will be given to medical practitioners and medical students by Dr. Greta Graff on Friday, Feb. 18th, at 6 P.M., at the Walworth Women's Welfare Centre, 153A, East-street, London, S.E. Practical demonstrations will be given on Friday, Feb. 25th, at 6 P.M. and at 7 P.M. Further information may be had from the secretary of the Clinic.

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CORRESPONDENCE

STREPTOCOCCAL MENINGITIS

To the Editor of THE LANCET

SIR,—Mr. Terence Cawthorne's timely paper in your last issue leads me to repeat two suggestions for the study and record of meningitis that I have already made in another journal (*Guy's Hosp. Rep.* 1937, 87, 477). These suggestions are, first, that we should keep cases secondary to ear disease distinct from those that arise from infection in the nose; and, secondly, that in otitic meningitis the condition of the middle-ear cleft, immediately before its onset, should whenever possible be determined so that we may make a careful distinction between meningitis arising from an acute invasion of the previously unaffected middle-ear cleft and that which complicates chronic otitis media.

I believe that such a distinction will do much to clarify the symptomatology and to put us in the best position to use sulphanilamide in the treatment of these cases that previously have been hopeless. We need to differentiate between those symptoms which are the direct result of meningeal irritation and those which arise from lesions of other structures, such as the dura mater or the cortex of the brain, which are involved at the same time. Mr. Cawthorne, upon whom has fallen the mantle of Mr. G. J. Jenkins, probably sees many cases of meningitis secondary to chronic ear disease in which one or more of the other neighbouring structures are involved. By the nature of my work I see more often cases that come in the other category in which meningitis is secondary to an inflammation of the previously unaffected middle-ear cleft, and in which it is rare for other lesions such as lateral sinus thrombosis or cerebral abscess also to be present.

Brief notes on the symptoms that Mr. Cawthorne describes under the stage of onset may bring out the difference in the two clinical types of otitic meningitis.

Headache.—I do not find this either early or constant. Its absence cannot be explained by the patients being children, for they do not cry. The earliest pain is in the neck on flexion, or in the back when testing for Kernig's sign.

Photophobia and *increase of tendon reflexes* I do not see.

A *rigor* results from a sudden access to the blood stream of a considerable dose of organisms. It is exactly the same as the rigor that supervenes upon a sudden entry of foreign protein in any other way, including the subdivision of the parasite in malaria. It is an indication of invasion of the lateral sinus which may accompany invasion of the meninges. This double invasion is probably commoner in chronic disease than in the type that I see, in which it is rare.

I am interested to read Mr. Cawthorne's note on *increased mental activity*, but I believe that this is characteristic of the hæmolytic streptococcus rather than of its access to the meninges, for I have seen it in cases of septicæmia without meningitis.

I do not believe that either *vomiting* or *convulsions* result from an inflammation of the meninges. I suspect that each is the result of a vascular disturbance of the cortex of the brain from retrograde embolism along or thrombosis of the cerebral veins that cross the meningeal cavity to the sinuses of the dura mater. Neither occurs in the pure meningitis secondary to an acute infection of the previously unaffected middle-ear cleft.

This leaves us with *neck* rigidity, which in such cases is the first and should be the only symptom. Removal of the factory of organisms in contact with the dura mater should be the routine without delay. Sulphanilamide may be given as an accessory; but had better be deferred until the diagnosis of streptococcal infection is confirmed by cultivation from the bone removed at operation. In this type of otitic meningitis diagnosis cannot be made by lumbar puncture. When anything positive can be obtained thereby the time to save the patient's life has passed.

Whether late cases will be saved in the future by means of this drug time alone will show. It is possible that they may be; but we must be careful not to allow patients to progress to this stage because we believe that we have a drug that may save their lives after we have endangered them by delay. Mr. Cawthorne has noted reports of 40 recoveries in eighteen months, but I do not think these reports make the distinction between the two clinical types of otitic meningitis that it is the purpose of this letter to emphasise: and I have yet to see one saved by sulphanilamide in the class of cases secondary to an acute invasion of the previously unaffected middle-ear cleft once it has passed on to the stage of the established disease.

I am, Sir, yours faithfully,

Guy's Hospital, S.E., Feb. 6th. T. B. LAYTON.

URTICARIA DURING BLOOD TRANSFUSION

To the Editor of THE LANCET

SIR,—I read with interest in your last issue the account of urticaria during blood transfusion by Dr. Stewart and Mr. Bates. Last year I observed a similar reaction, and at that time I was unable to find anyone who had had a like experience.

My patient was a woman aged 52, who was suffering from aplastic anæmia. She belonged to group A (Moss 2) and I used donors of the same group for every transfusion. She gave no personal or family history of allergy.

The transfusion concerned was the sixteenth; her first transfusion had taken place fourteen weeks before and the donor was giving blood for the first time. Direct matching of donor's blood and patient's serum showed compatibility and 450 c.cm. of blood was drawn into 50 c.cm. of citrate solution. The blood was injected at a rate of 10 c.cm. per minute. After 300 c.cm. of blood had been infused the patient said she felt hot; two minutes later I noticed that she was flushed and, as I watched, urticarial weals came out on her face, chest, and arms, being most marked on the arm into which I was giving the blood. I immediately stopped the transfusion and injected 5 minims of adrenaline subcutaneously. Her pulse-rate had risen from 90 to 120 and she still felt very hot. Twenty minutes later the weals had gone, but the flush persisted for about an hour. Ninety minutes later she felt her usual self. No rigor occurred. The donor had eaten a light fish lunch, and admitted to perfect health.

I kept some of the blood and citrate solution and next day injected intradermally a few drops of each, using saline as a control. No reaction whatever took place.

A week later I gave the patient another transfusion of 450 c.cm. About ten minutes after the infusion was over she again became very flushed and complained of breathlessness. On auscultation, the characteristic prolonged expiratory rhonchi of bronchial asthma were heard. I again injected 5 minims of adrenaline and she felt normal in an hour. There was nothing relevant in the donor's story.

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My patient received five further transfusions without untoward result. She died of pneumonia six weeks later.

So rare a complication occurring twice in one week in the same patient indicates temporary sensitisation to one of the constituents of foreign blood. As the second donor had not eaten fish, I feel we cannot incriminate the lunch eaten by his predecessor. The negative dermal reactions between the transfusions add further confusion.

Allergic phenomena are so elusive that I am disinclined to draw conclusions from a single case. I remember a woman who, after a transfusion for post-partum hæmorrhage, was seized by a violent paroxysm of sneezing. In this case, too, we must take comfort from the mystic word allergy.

I am, Sir, yours faithfully,

Elms-road, S.W., Feb. 6th. GAVIN THURSTON.

FOMITES IN TUBERCULOSIS

To the Editor of THE LANCET

SIR,—Now that the Government's Fitness Campaign is coming to an exciting end with special emphasis on the Tuberculosis "Service," may I as one who has had opportunities of noting the varying degrees of enthusiasm or indifference with which the battle against the "white scourge" is conducted in rural areas make one elementary suggestion? It is that some uniform and efficient method of disinfecting the bed, bedding, and room of the consumptive when he dies or is otherwise removed from his cottage should be adopted.

As far as my observation goes generally nothing is done at all. Sometimes the sanitary authority will come round rather belatedly and advise ordinary household cleaning; once or twice I have known them even burn a formalin lamp; but no energetic steps are taken to see, for example, that the blanket that has been encircling the dying consumptive's neck is not used to wrap up the new baby.

The trouble of course is the long incubation time of the tubercle bacillus. When at last this neglect becomes apparent the medical officer of health, the tuberculosis officer, and the sanitary officer are either comfortably retired or deservedly dead. Yet if there is one thing about which everyone seems to be agreed it is that massive infection should be avoided.

I am, Sir, yours faithfully,

Beckley, Sussex, Feb. 7th. C. G. LEAROYD.

ERYTHROCYTE SEDIMENTATION AND THE PLASMA FIBRINOGEN

To the Editor of THE LANCET

SIR,—Some years ago it occurred to me to wonder whether the plasma factors responsible for the increased erythrocyte sedimentation-rate (S.R.) in malignant disease, in some juvenile diabetes mellitus, and in some forms of arterial disease were always the same. The technique employed was similar to that described by Dr. Oakley in to-day's issue of THE LANCET. Rapidly sedimenting bloods from the different conditions were mixed together and the S.R. of the mixture was compared with that of the component bloods, the theory being that if a different excess or deficiency was responsible in the two diseases, mixing the bloods would compensate and the S.R. of the mixture would be considerably less than that of the component bloods taken separately. Unfortunately mixing bloods of different blood groups affects the S.R. and after spending some thousands of hours rediscovering a number of well-known facts, I found myself being dragged into the quicksands of little understood mathematical physico-chemistry and so abandoned a laborious research for which the time is not yet ripe.

One point, however, has a direct bearing on Dr. Oakley's paper. Any blood with a normal low S.R. mixed with a rapidly sedimenting blood affects a very considerable reduction in the rate. The reduction of the two-hour rate from 107 mm. to 44 mm., which occurred when 50 per cent. of blood without fibrinogen was admixed, could equally well have been produced by the addition of 50 per cent. of normal blood of the same group. Very careful control experiments would need to be done to justify the conclusion that the diminution in S.R. was due to lack of fibrinogen in the blood which was added.

It would be of interest if Dr. Oakley could keep in touch with Dr. Macfarlane's patient and report on what happens to the S.R. in acute infections. Such observations would, I believe, be unique.

I am, Sir, yours faithfully,

Oxford, Feb. 5th. DENYS JENNINGS.

MEDICAL DEGREES AT HONG-KONG

To the Editor of THE LANCET

SIR,—My attention has been drawn to an article on Medical Careers in the Tropics by Prof. R. T. Leiper, which you published on Oct. 16th last, and I would like through your columns to make a slight correction to the reference to medical education in Hong-Kong.

In the article it is stated that Hong-Kong, amongst other places, grants a diploma and that this diploma has recently been recognised by the General Medical Council of Great Britain. The true facts are that the Hong-Kong College of Medicine—founded exactly fifty years ago by Manson and his fellow-workers—did grant a diploma. In 1912 the University of Hong-Kong was opened and the College of Medicine ceased to exist as such and automatically became the medical faculty of the University. The last diplomas were granted in January, 1915, and since that date the only registrable qualification obtainable in Hong-Kong has been the M.B., B.S. of the university.

The recognition of this degree by the General Medical Council of Great Britain can hardly be called recent, for the medical faculty minutes of a meeting held in September, 1913, record the receipt of a letter from the registrar of the General Medical Council to the effect: "that the Council had decided to recognise the degrees in Medicine and Surgery of the University granted after examination, for registration in the Medical Register." This recognition has been continuous throughout the intervening period.

I am, Sir, yours faithfully,

L. T. RIDE,
Dean, Faculty of Medicine, University of Hong-Kong.

Jan. 21st.

CONTROL OF A TYPHOID EPIDEMIC

To the Editor of THE LANCET

SIR,—In your last issue you published a letter from Major R. F. E. Austin. In his capacity as vice-president of the National Anti-Vaccination League, his antipathy to all forms of prophylactic inoculation or vaccination is comprehensible, but as one who has belief in this form of treatment I fail to understand his arithmetic. The two cases of enteric landed from s.s. *Habana* had contracted the disease in Spain while the three subsequent cases diagnosed on May 30th, June 1st, and June 4th were probable

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contacts, and we naturally expected many more contacts to follow this second batch. The average incubation period for enteric is 14 days, but it may be much longer, with some latent cases (Greenwood and others, *Lancet*, 1937, 2, 1399) occurring weeks later. In Price's "Text-book of Medicine" (London, 1937) the following statement is made: "It is believed that an individual inoculated at the beginning or even in the middle of the incubation period of typhoid has a good chance of escaping the fever." Vaccination carried out in the first week after exposure to small-pox will prevent the disease.

I thoroughly appreciate the value of sanitation and hygiene, and our sanitary experts at the camp did admirable work in difficult surroundings, but it must be agreed that the sanitation of an emergency camp is far different from that of a modern town. Yet in two recent epidemics contact cases persisted for months, while our epidemic ceased after general inoculation.

I am, Sir, yours faithfully,

London, E.C., Feb. 5th. RICHARD TAYLOR.

RELATIVE IMPORTANCE OF INFECTIOUS DISEASES

To the Editor of THE LANCET

SIR,—In your report (p. 323) of a discussion on the enteric group diseases you quote me as saying that diphtheria and scarlet fever are far more important causes of death than enteric. What I actually said was: "The public should know that, *pace* the newspapers, enterica is not now such an important health problem as diphtheria or measles."

I am, Sir, yours faithfully,

ANDREW TOPPING.

London County Council, Public Health Department, Feb. 4th.

CONTRACEPTION AND FERTILITY

To the Editor of THE LANCET

SIR,—In your issue of Jan. 22nd Mr. Green-Armytage is reported as saying at a meeting of the West London Medico-Chirurgical Society on Jan. 7th that he "was convinced that contraceptive measures in the early days of marriage were inimical to pregnancy later." I have been instructed by the medical subcommittee of the National Birth Control Association to draw the attention of your readers to the fact that there appears to be no medical evidence whatever to corroborate this statement. Records which have been carefully kept at clinics go to show that in many thousands of instances fertility has been in no way impaired by the use of contraceptive measures in early married life.

I am, Sir, yours faithfully,

M. A. PYKE,
Secretary, National Birth Control Association.

26, Eccleston-street, London, S.W.1, Feb. 2nd.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 29TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2431; diphtheria, 1892; enteric fever, 61 (26 "expected"); pneumonia (primary or influenzal), 1302; puerperal pyrexia, 191; cerebro-spinal fever, 28; acute poliomyelitis, 6; acute polio-encephalitis, 1; encephalitis lethargica, 3; dysentery, 273; ophthalmia neonatorum, 103. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Feb. 4th was 4388, which included: Scarlet fever, 817; diphtheria, 1409 (carriers 34); measles, 747; whooping-cough, 311; puerperal fever, 23 mothers (plus 10 babies); encephalitis lethargica, 282; poliomyelitis, 0. At St. Margaret's Hospital there were 16 babies (plus 2 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox, 2 (0) from enteric fever, 37 (2) from measles, 10 (0) from scarlet fever, 16 (2) from whooping-cough, 40 (7) from diphtheria, 60 (25) from diarrhœa and enteritis under two years, and 60 (9) from influenza. The figures in parentheses are those for London itself.

Croydon reported the 2 deaths from typhoid. Liverpool had 10 deaths from measles, Manchester 5. Birmingham reported 4 deaths from whooping-cough, Liverpool 3. Diphtheria was fatal in 23 great towns, Manchester reporting 5, Liverpool 4.

The number of stillbirths notified during the week was 286 (corresponding to a rate of 43 per 1000 total births), including 49 in London.

THE LANCET 100 YEARS AGO

February 10th, 1838, *p.* 701.

From a paper "On Benevolent Funds and Life Assurance in Health and Sickness," read before the Council of the British Medical Association [an ephemeral rival of the present Association] by WILLIAM FARR. *Farr, the founder of the science of vital statistics, became compiler of abstracts in the registrar-general's office in 1838 and held this post for 41 years.*

Medical men, like people of other professions, sink, in addition to the sums spent in their early education, capital in acquiring a knowledge of the sciences, and professional skill, which can be rarely turned to account, so as to yield a fixed income, before the age of thirty; and, after that period, some time elapses before they realise a fixed income surpassing the expenditure their families and their position and success in society demand. Such is the general course of things. Arrived at this point, several cases may be supposed. A certain number realise an ample income. The majority succeed in establishing themselves so as to bear up under ordinary circumstances; to live from year to year, but to have no surplus. Some travel over the best part of life in this uncertain struggle; and sickness, accident, untimely death, plunge the individual, or those dependent upon his exertions, into destitution. This is often the man's own fault; he or his family have been vicious, improvident, extravagant, or unmindful. But this is not always true: looking around us at the numbers of competitors and at the inequalities that spring up in practice, we may fairly exclaim with the fisherman who had just escaped drowning: "Master, I marvel how the fishes live in the sea,"—and admit the accuracy of the allusion, "Why, as men do a-land; the great ones eat up the little ones." Such inequalities arise very naturally, and are inevitable. . . . It is to alleviate the pressure of accidents, and the bitterness of privation arising in these circumstances, that the Benevolent Fund is set apart. . . .

We come now to the question what should medical men do in providing against the contingencies of life. First. Every man, having a wife, children, or aged parents dependant on his exertions, should unquestionably insure his life, so soon as he can set aside a sum, however insignificant, from his income. . . . Those who cannot provide for the present of course cannot assure against futurity; they must redouble their exertions, trust in Providence, and hope in the benevolence of our fund. Few in a profession like ours require to be assured against ordinary attacks of sickness; but in extreme cases of protracted disease, or chronic disability, this kind of assurance may prevent many from falling into misery or dependence. . . .

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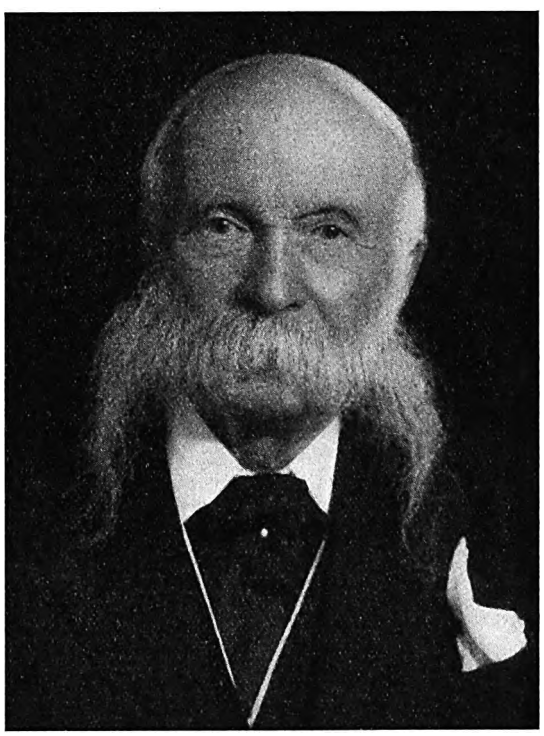
OBITUARY

SIR JAMES CRICHTON-BROWNE, M.D., LL.D., F.R.S.

Sir James Crichton-Browne died at his home in Dumfries on Jan. 31st, at the age of 97. His vitality and perpetual youth, which were the admiration and envy of his colleagues, proved inadequate to withstand the shock of the death of his son last October.

James Crichton Browne was born at Edinburgh in 1840, the son of Dr. W. A. F. Browne, a commissioner in lunacy for Scotland, and was educated at Dumfries Academy, at Trinity College, Glenalmond, at Edinburgh University, where he was a pupil of Lister, and at the University of Paris. He qualified L.R.C.S.Edin. in 1861 and M.D. in the following year, and became medical officer successively at Derby, Devon, and Warwick county asylums, and medical superintendent at Newcastle borough asylum. In 1866 he took charge of the West Riding asylum at Wakefield, where his clinical and pathological investigations in neurology paved the way for the later researches of Ferrier, Hughlings Jackson, and Horsley. Here he founded and edited the "West Riding Asylum Reports," the first British journal of neuropathology. In 1875 he left Wakefield on being appointed Lord Chancellor's visitor in lunacy, a post he held until 1922. For nearly fifty years his advice was thus available to the Court of Chancery through the Master in Lunacy about the comfort and supervision of the wards and the proper allocation of their estates.



[Photograph by Elliot & Fry

He was one of the first and most inspiring advocates of the early treatment of threatened mental breakdown as an essential first-aid in mental illness, which the Mental Treatment Act of 1930 has brought within the reach of both rich and poor. He urged the necessity of the study of childhood as affording the best key to the interpretation of early mental symptoms, and his thesis published in 1883 in Malcolm Morris's "Book of Health" is still the standard authority on the relation between education and the nervous system. In the following years he successfully aroused public opinion against overpressure in elementary schools and the principle of payment by results. In 1886, when he was knighted, THE LANCET said "he has well won his spurs as a scientist, and will wear them not only worthily but with the esteem of his profession." In 1883 at the proposal of Charles Darwin he had been elected a fellow of the Royal Society, and in 1889 he became treasurer of the Royal Institution, at the meetings of which he was for long a prominent figure. He was given honorary degrees by the universities of St. Andrews, Aberdeen, Leeds, and Edinburgh, and was president at various times of the Medical Society of London, the Neurological Society, the Medico-Psychological Association, the National Health Society, and the Sanitary Inspectors' Association. He was one of the founders of *Brain* and edited the journal for a time with Hughlings Jackson and David Ferrier.

His official duties, which necessitated much travelling about the country, would have monopolised the energies of most men, but did not prevent him from interesting himself in other subjects—he took part in a controversy with Froude about the relations of Carlyle and his wife. But his main fields were those of mental and nervous disease and public health. He held strong views against teetotalism and maintained that no writer had done much without alcohol. He disagreed with the Psalmist's three score years and ten; by using common sense and avoiding fads everyone, he said, should live to a hundred. With advancing age his energies were amazingly retained, and since 1930 he had published five volumes of reminiscences, of which his "More Leaves from a Doctor's Diary" appeared last October, besides speaking of his experiences and propounding his philosophy on the wireless. His Dundreary whiskers, the last of their kind, his courtly manners and rounded phrases brought us a glimpse of the Victorian era at its best.

Sir Robert Armstrong-Jones, who was his colleague for the last ten years of his official life as Lord Chancellor's visitor, says of him: "He was a man of wide reading, accurate thought, and clear expression, as well as of marked literary culture and ability. In a controversy his weapon was the invincible spear of sound reason, which characterised all his arguments. He was an especially gifted orator, and indeed one of the best after-dinner speakers in our day. He was eloquent, clear, decisive, and well-informed. He possessed a mind of no ordinary intellectual powers, strengthened by an excellent memory. He never spoke except with the dignified and graceful authority of a supreme master of his subject, and he was listened to with riveted attention, admiration, and respect, more especially when pleading the cause of the mentally ill and the men and women who succour them. The amount of time, labour, and scrupulous attention he devoted to the care and treatment of the most afflicted of suffering humanity was immense. Nor did he overlook the material comforts of those under his care. His patients reposed implicit trust in his courteous vigilance as a guardian of their welfare, and after his retirement would often recall his deeply felt understanding and sympathy, and his generous and real friendship."

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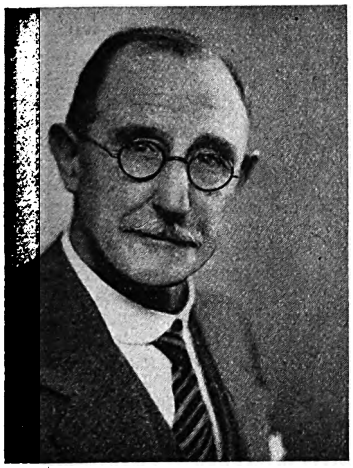
Sir James's first wife was the daughter of Dr. Halliday, and died in 1903 leaving him with a son and a daughter. In 1912 he married Audrey Emily, daughter of Sir E. Bulwer and niece of Bulwer Lytton. His son, Colonel Harold W. A. F. Browne the explorer, died in October, 1937, at the age of 71.

ANDREW EDWARD HODDER, D.S.O., M.B. Camb.

Dr. Hodder, who died on Feb. 3rd at his home in Stafford, had played a large part in public life there, on governing bodies of schools and on insurance committees. Born in Dulwich and educated at Bedford School and King's College, Cambridge, where he was Vintner exhibitioner, Dr. Hodder qualified from St. Mary's Hospital, Paddington, in 1901, and after a house appointment there practised for several years in Wigan before settling in Stafford, where he joined the staff of the General Infirmary first as anæsthetist and later as physician. Within a year or two he was elected to the Staffordshire panel committee, becoming its chairman in succession to the late Dr. Ridley Bailey, and representing the Ministry on the insurance committee. Having at school joined the cadet corps and the territorials in Lancashire, he transferred to the North Midland division of the R.A.M.C. and went to France in 1915 with the 3rd Field Ambulance; two years later he was given command of this unit with the rank of lieut.-colonel and was awarded the D.S.O. On his return after the war he became a governor (and later chairman) of King Edward VI Grammar School and of the Girls' High School, and served for a time on the health committee of the town council. He played an active part in the development of orthopædics at the cripples' centre and in the local nursing association. He was also president at one time or another of the North Staffordshire and the Mid-Staffordshire medical societies. "By culture, temperament, and experience," writes a colleague, "Hodder made an ideal chairman. He held the balance of debate with equal poise and had the gift of seeing the other man's point of view. But amidst his various interests one stood out above all others—his efficiency in his daily job. He had a high sense of the dignity of general practice, and while he made full use of the modern methods of diagnosis he regarded the clinical acumen of the family doctor as the final arbiter."



Dr. Hodder married in 1910 Ethel Mary, elder daughter of Prof. A. C. Haddon, F.R.S., and leaves her with a son and three daughters. He was in his sixty-third year.

THOMAS DONNELLY, M.D. Dubl., F.R.C.S.I., D.P.H.

Dr. Donnelly died last week after some years' retirement from practice. He had spent his life in or near Dublin, from boyhood at Belvedere College and undergraduate days at Trinity College. He took an honours degree (senior moderatorship) in experimental science in 1878, and the medical degrees in 1881, and in 1886 he was admitted a fellow of the Royal College of Surgeons in Ireland. For some time he was assistant physician and pathologist to the House of Industry Hospitals, but on receiving an appointment in the poor-law medical service he devoted himself to general practice on the north side of Dublin. He interested himself greatly in the amelioration of conditions of work in the poor-law medical service, and for a long time was hon. secretary of the Irish Medical Association and editor of its journal. Several years ago he retired from professional work and went to live on a farm he owned some five or six miles from the city. Although he retained a gradually diminishing circle of old friends, he was but little known to the younger members of the profession. He was a man of culture, kindly and courteous in his relations with others, and a capable physician.

ERNEST HAROLD DRINKWATER, L.S.A.

Dr. Drinkwater, who died on Jan. 20th in London after a short illness, qualified at Liverpool in 1903 and then came to London for post-graduate study. "He was," writes F. R.-S., "a man of many parts. Beginning early in general practice in a populous district in South London, he gained a wide experience of medicine and surgery, and developed a keen insight into the psychological side of his profession. Later he devoted himself for a time entirely to anæsthetics, holding posts at the Prince of Wales Hospital, Tottenham, and the Royal Dental Hospital. Finding this too restricted for his activities he again took up general practice as a consultant, developing especially the side of electrotherapeutics which had always interested him. The meticulous care and thoroughness with which he investigated every case, coupled with an intuitive perception, sometimes led to success where others had failed. He remained a keen student to the end of his career, and was always abreast of the latest researches in medical science. Latterly his health had suffered through untiring devotion to work."

Dr. PERCY COLEMAN, who died at Clacton-on-Sea on Feb. 4th, was one of the founders of the local hospital and for many years chairman of its board of management. Qualifying from St. Thomas's Hospital in 1890, Dr. Coleman took his medical degree at Durham two years later, and before settling in Clacton he had held many house appointments. One of these was house physician at the Middlesex Hospital and he became medical officer to their seaside convalescent home. He was also on the staff of the many other convalescent homes in the neighbourhood.

INSTITUTE OF RAY THERAPY: NEW EXTENSIONS.—On Feb. 5th the Princess Royal visited this institute, in Camden-road, N.W., to open its new extensions. The ceremony was held in the new building on the ground floor which has yet to be equipped. On the first floor the new electrotherapy department with its equipment for short-wave diathermy and inductothermy has already been established. There are also sections for physical and remedial exercises and for medical electrical treatment. In the old building, which has been thoroughly renovated, X ray treatment and other forms of irradiation will be given. The extension has cost £7500 and £1500 more is required to complete the equipment. The institute is open from 2 P.M. to 9 P.M. daily for the treatment of people of small means and there are over 3000 attendances each week.

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PARLIAMENTARY INTELLIGENCE

VITAL STATISTICS

ON Feb. 1st the committee stage of the Population (Statistics) Bill was completed in the House of Commons. Sir KINGSLEY WOOD, Minister of Health, said the principal effect of the amendments he was proposing would be the substitution in the schedule of a limited number of defined but simple particulars for the census procedure to which objection had been taken; the particulars to be provided by the person whose duty it was to give the information under the Registration Acts. Such a person was required to give only facts within his knowledge (as from July 1st next), the information being secret and privileged. These particulars would generally supply information about the degree of fertility of the mother, about childless wives, and the information requisite for statistical utilisation of such information. Simple and limited as they were, they would enable an advance to be made in the study of fertility. It would be possible to get, for instance, particulars of the whole issue of the mother. At present the birth-rate information in this country was based on a mass of unrelated units, consisting on each occasion of parents and one child. As a result of this Bill certain supplementary lines of investigation could be made. For instance, the particulars furnished as to the mother's issue, distinguishing living and dead or stillborn children, would help to elucidate the relation between high infantile mortality and a high birth-rate. Cancer had long been studied in relation to marriage in women; it would now be possible to investigate it from the aspect of childless wives and those who had produced children. Recently a letter had appeared in the *Times* from a number of eminent people asking that further particulars should be provided than the mere statement of occupation in general terms; they wanted, on what he might call general census lines, the classification of over 600 heads. For such detailed requirements he thought it would be better to use the powers given under Section 44 of the Births and Registration Act, 1874, which permitted the heading in the registers to be altered and various processes to be adopted whereby more detailed information could be obtained. There was an amendment limiting the operation of the Act at ten years. He did not regard this as unreasonable. Before the end of that period they might have sufficient information upon which to consider the whole matter in its larger aspects.

Mr. PETHICK-LAWRENCE remarked that the proposed alterations would leave about a third of the original measure. But what remained would still attain the object which statisticians had at heart.

Sir FRANCIS FREMANTLE said that since the second reading he had been in touch with statisticians, economists, and sanitarians, and he still believed there were certain points in the original Bill that would have been useful to a statistical inquiry, though they were not essential. The restriction upon the powers of those who were to carry out this investigation would not, he hoped, be found to be too great. The object of this inquiry was nothing less than the answer to the question whether the nation would survive. It would take a considerable time, and they might be losing precious years while other countries had already taken successful steps to stop depopulation.

Sir KINGSLEY WOOD thought that public opinion would grow steadily in favour of the course that had been taken. The amendments were then agreed to and a further amendment that the Act should continue in force until June 30th, 1948. It was agreed that the information required on the registration of a birth or stillbirth should comprise:

(*a*) The age of the mother;
(*b*) The date of the marriage;
(*c*) The number of children of the mother by her present husband and how many of them are living;
(*d*) The number of children of the mother by any former husband and how many of them are living;

and that information on the registration of death should be given as follows:

(*a*) If the deceased was a male, whether he had been married, and, if so, whether he was married at the date of death;

(*b*) If the deceased was a woman and had been married: (i) the year in which she was married and the duration of the marriage, (ii) whether she had children by her husband or any former husband;

(*c*) The age of the surviving spouse, if any, of the deceased.

NOTES ON CURRENT TOPICS

Botulism on British Steamer

Mr. BARNES asked the President of the Board of Trade the cause of the fatalities to the crew of s.s. *Sea Rambler*; whether he was in a position to state if Board of Trade regulations were in any way infringed during this voyage; and whether a Board of Trade inquiry was to be held.—Mr. OLIVER STANLEY replied: Certain members of the crew of s.s. *Sea Rambler* were taken ill while the vessel was at sea during August. On putting into Funchal, Madeira, for medical assistance the disease was diagnosed by the local port medical authorities as food poisoning in two sailors and botulism in five, and an entry in the log was made to that effect. Two of the men died on board, and five men died in hospital at Funchal. Upon arrival at North Shields the usual statutory inquiry was held by the superintendent of the Mercantile Marine Office on Sept. 14th and 15th. The superintendent endorsed the entry in the log. Since the inquiry was held, examination of blood samples from surviving members of the crew has shown that they had suffered from yellow fever. I have no reason to think that Board of Trade regulations were infringed during the voyage. I should like to take the opportunity of expressing my deep sympathy with the relatives of the men who died.

Blind Persons Bill

In the House of Commons on Feb. 1st, when the Blind Persons Bill was considered in committee, Sir K. WOOD moved an amendment to Clause 2 that was designed to bring about greater uniformity in the treatment by local authorities of blind persons in matters not affected by local conditions. This was agreed to. An amendment moved by Mr. WINDSOR and also accepted empowered a local authority to pay or contribute to funeral expenses in the household of a blind person who was dependent on it, the payment of contributions being made under the Blind Persons Act instead of under the poor law.

Mr. JAGGER moved an amendment to Clause 5 providing that in any dispute the decision as to whether a person was blind or not should be left to two ophthalmologists, and a third if these disagreed. Sir K. WOOD pointed out that the conditions had been met by a circular in 1933 which set out the optical criteria defining incapacitating blindness. It would not be practicable everywhere to establish a referee service, since in some areas it would often be difficult or impossible to find the requisite number of specially qualified medical practitioners. The amendment was therefore withdrawn.

Prevention of Road Accidents

In the House of Lords on Feb. 1st it was agreed that the Select Committee on the Prevention of Road Accidents should be appointed as follows: The Marquess of Reading, the Earl of Iddesleigh, the Earl of Birkenhead, Lord Brocket, Lord Alness, Lord Rushcliffe, and Lord Addison.

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QUESTION TIME

THURSDAY, FEB. 3RD

Miners' Nystagmus

Mr. JAMES GRIFFITHS asked the Home Secretary if he had received the report of the Committee on Miners' Nystagmus and Lump-sum Settlements; and whether it was proposed to introduce legislation dealing with these matters.—Sir SAMUEL HOARE replied: Yes, Sir, I have received the report. It has been presented to Parliament and will be issued very shortly. I cannot make any statement at present about legislation.

Alcohol and Motor Accidents

Captain ARTHUR EVANS asked the Home Secretary whether his attention had been called to the light sentences passed on motorists convicted of drunkenness when driving and of causing the death of other road users; and whether, taking the whole of the road fatalities of 1937 he could state the number of prosecutions instituted in connexion with them.—Sir SAMUEL HOARE replied: There is no possibility of relating figures of offences by motorists with figures of fatalities. There are, for example, many prosecutions for driving when under the influence of drink where no fatality has occurred; and on the other hand there are many fatalities where no prosecution follows either because there are no grounds for a criminal charge or because the driver suspected of an offence has been killed. The returns of offences relating to motor vehicles during 1937 are not yet complete, but a preliminary examination shows that during the year there were 15 convictions of manslaughter arising out of fatal accidents and that in 13 of these cases the defendant was sentenced to penal servitude or imprisonment.

Anti-Gas Training

Mr. GLEDHILL asked the Home Secretary if any instructions or suggestions had been issued to local authorities regarding the size and type of building used for anti-gas schools and decontamination centres.—Mr. GEOFFREY LLOYD, Under-Secretary, Home Office, replied: Guidance as to the requirements at places where local anti-gas training is undertaken has been given in circulars and is embodied in Section 5 of the Air Raid Precautions Memorandum No. 5—Anti-gas Training. As regards first-aid posts at which facilities for the decontamination of the public would be provided, revised advice was issued to local authorities in a circular on Dec. 10th, 1937, and the further details then promised will be issued shortly.

In reply to a question by Dr. HADEN GUEST and other hon. Members Mr. LLOYD stated that the Home Office would shortly issue to local authorities a supply of the book that had been prepared which could then be circulated to the Air Raid Wardens. In the light of the experience thus gained it would be possible to decide in what form printed advice to each householder could most effectively be given and how and when it should be distributed.

Nursery Schools

Major WHITELEY asked the Parliamentary Secretary to the Board of Education how many nursery schools and classes had been, or were being, established in England and Wales since the issue of Circular 1444 in 1936; how many children were affected; and what was the usual cost to the parent.—Mr. KENNETH LINDSAY replied: Since the issue of Circular 1444, the Board have recognised 19 nursery schools in England and Wales, with accommodation for 1193 children: 32 further proposals providing for 2340 children have been approved in principle: 12 other proposals are under consideration. Under the Board's Regulations no charge can be made to parents of children attending nursery schools except for food and medical treatment. Very little is charged for medical treatment, and the charge for food varies from 1*s.* to 2*s.* 6*d.* a week, with an average of about 1*s.* 3*d.* A reduction or remission of the charge is made in necessitous cases. During the same period provision involving capital expenditure has been approved for 220 nursery classes in public elementary schools, accommodating about 9000 children. The Board's records, however, are not complete, since local education authorities are not required to notify the Board of the establishment of such classes. As in the case of nursery schools no charge may be made to the parents except for food and medical treatment.

Typhoid Fever in Somerset

Sir FRANCIS FREMANTLE asked the Minister of Health if he would give the number of cases and deaths hitherto notified in the present outbreak of typhoid fever in the county of Somerset; and whether the cause had yet been traced.—Sir KINGSLEY WOOD replied: Twenty-four cases, three of them fatal, of the disease have been confirmed. The source of infection has not yet been established and investigations, in which a medical officer of my Department is assisting, are proceeding.

Treatment of Epilepsy

Sir ARNOLD WILSON asked the Minister of Health whether any organised special research into the causes and treatment of epilepsy was proceeding under the auspices of his department in conjunction with the Medical Research Council; whether the British Government was officially represented on the council of the International League Against Epilepsy; and what subvention, if any, it gave towards its activities.—Sir KINGSLEY WOOD replied: I understand that the Medical Research Council are carrying out certain investigations which have a bearing upon epilepsy and related conditions. With regard to the two last parts of the question H.M. Government is not officially represented on the council of the International League Against Epilepsy, nor does it make a contribution in aid of the Council's work.

Prisoners Certified Insane

Mr. JOEL asked the Home Secretary how many persons undergoing imprisonment at Maidstone, Parkhurst, and Dartmoor gaols had during the past five years, been transferred to Broadmoor or other asylums at the termination of their sentences; and how many had been so transferred before the completion of their sentences.—Sir SAMUEL HOARE replied: Persons sentenced to penal servitude who appear to be of weak or unstable mentality are assigned to Parkhurst prison, and during the five years ended 31st December last, 23 of the men sent to this prison were certified as insane and removed to Broadmoor Asylum; two others were certified as mentally defective and sent to Rampton State Institution. There was also removed to Broadmoor Asylum one man who had been sent to Dartmoor prison. All these men were transferred during the currency of their sentences. There were no other cases of men removed from the prisons named to any asylum.

MONDAY, FEB. 7TH

Pasteurisation of Milk

Captain ARTHUR EVANS asked the Minister of Agriculture if his attention had been drawn to the investigations carried out by the Hannah Institute of Dairy Research into the feeding of calves on raw and pasteurised milk by experiments with two groups of calves, the first group with ordinary commercial milk in its raw state, the second group with the same milk after it had been submitted to ordinary commercial pasteurisation in a local dairy; that the results showed that of the 36 calves fed on ordinary commercial milk in its raw state 23 were ultimately found to be infected by tuberculosis mainly in the lungs, and of the 37 calves fed on the same milk after it had been submitted to ordinary commercial pasteurisation in a local dairy no case of tubercular infection was found; and, in view of this, whether he would take steps to make compulsory pasteurisation of all milk marketed.—Mr. MORRISON replied: The answer to the first part of the question is in the affirmative. As regards the second part of the question the Government's proposals regarding the compulsory pasteurisation of milk are outlined in the white paper on Milk Policy issued in July last, and as already announced, it is the Government's intention to bring forward legislation this session on these lines.

TUESDAY, FEB. 8TH

Assault on Patient in Scottish Asylum

Mr. MCGOVERN asked the Secretary of State for Scotland if he could make any statement on the case which came

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before Sheriff More, at Banff on Jan. 25th, when Georgina Isabella Logan was charged with beating a dumb woman patient at Ladybridge Asylum, Banff, with a shoe, when in defence she stated that she had seen other nurses do the same thing; what steps were being taken to safeguard these patients against treatment of this kind in future; and if inquiry would be held into the alleged brutalities in this institution.

Mr. ELLIOT replied: Georgina Isabella Logan, aged 18, joined the Banff District Asylum staff as a nurse probationer on Jan. 2nd, 1938. The assault on the patient was committed on Jan. 10th. The matter was reported to the Medical Superintendent next day, and he immediately suspended Nurse Logan and reported the matter to the Procurator-Fiscal. On Jan. 25th Nurse Logan pleaded guilty and the Sheriff deferred sentence till May 11th. Nurse Logan has since been dismissed from the asylum service. The asylum authorities have inquired into Nurse Logan's statement that she had seen other nurses do the same thing. The inquiries were made at the asylum by the county clerk and his deputy, and they reported that they were satisfied that there was no ground for the allegations. Any asylum nurse striking a patient is liable to instant suspension followed by dismissal, and all such offences are reported to the Procurator-Fiscal in order that criminal proceedings may be considered. The General Board of Control have considered this case and are satisfied that it is an isolated one, but I have asked the Board to furnish me with a fuller report on the whole matter.

Food and Drugs Consolidation Bill

Mr. HALL CAINE asked the Minister of Health what steps he proposed to take to negotiate with the various interests concerned as to the terms of the draft Food and Drugs Consolidation Bill; and whether he would give an undertaking that all the interested bodies would be consulted before the Bill was presented to Parliament.—Mr. BERNAYS replied: The draft Bill has been published and placed on sale, and my right hon. friend will be prepared to consider representations from any interested bodies before the Bill is presented to Parliament.

PUBLIC HEALTH

Local Outbreaks of Typhoid

THE sharp rise in the number of cases of enteric fever in the Weekly Return is accounted for chiefly by 9 cases in Somerset (Bridgwater R.D. 8, Burnham-on-Sea 1) and 26 cases in Pembroke (Haverfordwest R.D. 25, Fishguard 1).

The remaining 26 are scattered cases in Chester 2 (Stockport, Altrincham); Cornwall 1 (Scilly); Derby 2 (Staveley, Chesterfield R.D.); Durham 1 (Gateshead); Hertford 1 (Bishops Stortford); Kent 1 (Orpington); Lincoln 1 (Scunthorpe); London 8 (Hampstead 2, St. Marylebone 1, Stepney 3, Wandsworth 1, Westminster 1); Middlesex 1 (Ruislip); Northumberland 1 (Newcastle-on-Tyne); Nottingham 1 (Warsop); Southampton 1 (New Forest R.D.); Surrey 3 (Coulsdon, Sutton, Godstone R.D.); Warwick 1 (Rugby); Glamorgan 1 (Swansea).

In the Highbridge area of Somerset 30 cases have been reported up to the present time with 3 deaths. No direct evidence of the cause of the outbreak has yet been discovered. Dr. J. F. Davidson, county medical officer, is being assisted in his investigations by Dr. Norman Smith of the Ministry of Health. All public water is being chlorinated and instruction given to boil both water and milk, although so far there is no indication that the infection is being spread by either. Sunday schools and infant schools at Highbridge and Huntspill have been closed for the time. Huntspill itself is now taking its water from the Bridgwater town supply which is easier to chlorinate than is the rural supply. Axbridge isolation hospital has been reserved for the typhoid cases, other infectious diseases being accommodated for the time elsewhere. At Burnham-on-Sea employees in local industries coming from the Highbridge area have been asked to remain at home and the public has been advised against the eating of lettuce and tomatoes.

In North-west Pembroke around St. David's 29 cases have been notified with 2 deaths. All the patients have been sent to the isolation hospital on the outskirts of Pembroke Dock where a scarlet fever ward has been cleared, and there has been some local apprehension from the concentration of typhoid cases in so populous an area. Here again Dr. H. Middleton, county M.O.H., has stated that all possible precautions have been taken, and special injunction has been issued to those who handle food to wash their hands before doing so.

In Northumberland 21 cases in all have recently been reported. The Newcastle health department states that none of the patients is now seriously ill and that so far it has not been found possible to trace the source of the infection.

The Comprehensive Health Visitor

Since 1929 the tendency has been for local authorities to appoint health visitors, each of whom will carry out all the duties of health visiting and nursing, including school nursing. In a paper published in the *Journal of State Medicine* for January, 1938, Miss E. J. Moorehead, superintendent of health visitors at St. Helens, brings forward weighty objections to this policy, but does not perhaps give due value to the three reasons why most medical officers of health favour it. The chief of these is that the divorce of school medicine from child welfare inhibits the continuance of supervision—and supervision of the rearing of children is the main function of the health visitor. Miss Moorehead thinks it an advantage to dissociate preventive from curative nursing. We do not accept this argument, for when preventive work becomes clinical, being applied to individuals, its separation from curative work is artificial. We agree that if health visitors are to do all public health nursing, their district must be limited; but people do not like unnecessarily many invaders of their homes and we submit that a district is better served by health visitors to each of whom a part of the area is assigned than by the same number serving the whole in different capacities.

ABSORPTION OF FAT.—At a meeting of the Society of Public Analysts and Other Analytical Chemists on Feb. 2nd, with Dr. G. Roche Lynch, the president, in the chair, Dr. A. C. Frazer read a paper on fat absorption and metabolism. He presented evidence that passage of fats through the walls of the small intestine can take place without hydrolysis to fatty acids and glycerol. In cats such hydrolysis cannot occur, for there is no lipase in the intestines. In human beings lipase is present and part of the fats ingested penetrates the intestinal walls as fatty acids, but a large proportion penetrates unchanged. The fatty acid portion passes to the fat depôts by way of the portal vein, liver, and hepatic vein, but the unhydrolysed fat avoids the liver and passes to the fat depôts by way of the lacteal lymphatics and the systemic vessels. The presence of particles of unhydrolysed fat in the blood was detected microscopically by use of dark-ground illumination, and this means was used to study variations in the concentration of the fat particles in the blood in course of digestion.

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MEDICAL NEWS

University of Cambridge

On Feb. 4th the following degrees were conferred :—

M.D.—R. M. Dowdeswell.
M.B., B.Chir.—J. S. Joly and R. D. I. Beggs.
M.B.—K. L. Buxton (by proxy).

Titles of the degrees M.B. and B.Chir. were conferred during January on the following members of Girton and Newnham Colleges : A. C. Clark, G. E. Grove, and V. E. A. Sykes.

At recent examinations the following candidates were successful :—

D.M.R.E.

Part I.—Frederic Bush, S. J. H. Douglas, Heather D. Dowling, Theunis Fichardt, Kathleen M. Henderson, T. H. Hills, F. B. Kiernander, O. C. Levine, Kenneth Lumsden, R. L. Mansi, A. M. Mansour, John Morton, R. S. Padaki, C. N. Pulvertaft, S. J. R. Reynolds, Alice M. Ross, Amnuey Smerasuta, C. G. Talwalkar, S. El D. H. El Taoudi, W. E. M. Topping, Leslie Werbeloff, and M. A. A. Zohdy.

University of London

On Mondays, Feb. 28th, March 7th, and 14th, at 5 P.M., Mr. J. F. Danielli, Ph.D., will lecture on surface chemistry and biology. The lectures will be held at University College, Gower-street, W.C., and are open to all.

University of Durham

Dr. Albert Gild and Dr. J. W. M. Sutherland have been appointed demonstrators in anatomy at King's College, Newcastle-upon-Tyne.

Scottish Conjoint Board

At recent examinations by the board of the Royal Colleges of Physicians and Surgeons of Edinburgh and the Royal Faculty of Physicians and Surgeons of Glasgow the following candidates were successful :—

M. J. Ackerhalt, Z. S. Alpert, Abraham Appel, Stewart Bauman, R. A. Blair, Ernst Cohn, R. M. Cross, T. B. Dev, R. B. Dobson, E. F. Duschock, M. M. Elkind, Mandel Friedman, Jacob Gillman, K. A. Graf, Hans Grundmann, Victor Guyer, A. T. R. Hamilton, T. W. Howat, Hugh Hutton, W. M. Jamieson, K. E. Karunaratne, Yetta Kuper, Murray Levin, Hyman Leibowitz, Meieris Lichtensteinas, J. T. McCutcheon, P. W. F. McIlvenna, James McMillan, K. P. F. J. M. Mangold, William Meadow, Jay E. Mishler, W. S. Murray, R. P. Myers, Anna Noll, U. E. Oberworth, Samuel Pollack, J. S. Pomerantz, Livingston Rae, Arron Rapoport, F. L. Reardon, C. G. Rosenstock, William Rothman, Nathan Schwartz, Louis Scovronek, Morton Shapiro, Max R. Simon, W. E. C. Taylor, A. J. Walder, Morris Weinschel, David Wilson, and A. A. Wright.

Royal College of Physicians of Edinburgh

A quarterly meeting of the College was held on Tuesday, Feb. 1st, Dr. Alexander Goodall, the president, in the chair. Dr. John Dalziel Wyndham Pearce (London), Dr. John Paton McGibbon (Edinburgh), and Dr. William Melville Arnott (Edinburgh) were introduced and took their seat as fellows of the college.

Course in Venereal Diseases

During March, April, and May a course on modern methods in the diagnosis and treatment of venereal diseases will be given by Lieut.-Colonel E. T. Burke at the London County Council (Whitechapel) Clinic, Turner-street, E. Further particulars will be found in our advertisement columns.

Health on the Roads

The Royal Automobile Club, reporting on the health of its staff of guides, who are to be found on the roads in all parts of the country, states that over a period of twelve months the total amount of time lost through sickness was only 750 days. The road staff of the R.A.C. numbers approximately 1000 men, and taking into consideration rest-days and holidays, the total number of days that could be worked would be about 300,000. These men work exclusively in the open air—patrolling on motor-cycles, carrying out point duty at cross-roads, car-parking, and so forth. As a rule the harder the weather, the longer are the hours that have to be worked, for it is when conditions are most severe that a guide will probably find most to do.

Sir Ernest Graham-Little, M.P., has been elected an honorary member of the Argentine Dermatological Society.

British Institute of Philosophy

An address on philosophy and the common reader will be given by Prof. L. S. Stebbing on Tuesday, Feb. 15th, at 8.15 P.M., at University College, Gower-street, London, W.C. Cards of admission can be obtained from the director of studies of the institute, at University Hall, 14, Gordon-square, W.C.1.

Order of the Nile

The King has given permission to Dr. R. A. Gardner and Mr. A. K. Henry to wear the insignia of Commander of the Order of the Nile, which have been conferred on them by the King of Egypt in recognition of their services in the employment of the Government. Dr. Gardner was formerly director of the Institute of Radiology at the Egyptian University, Cairo, and Mr. Henry, who is now reader in surgery at the British Postgraduate Medical School, was professor of clinical surgery in the Faculty of Medicine, Cairo.

Ella Sachs Plotz Foundation

The trustees of this foundation are anxious to make known the resources of their fund for the advancement of scientific investigation. The foundation seldom or never offers stipends to investigators; nor does it provide apparatus and materials which are ordinarily part of laboratory equipment. Its special purpose is to give grants for the purchase of apparatus and supplies required for special investigations and for the payment of unusual expenses, including technical assistance. The research should bear closely on medicine or surgery, and the maximum size of grants will usually be less than $500. In the fourteen years of its existence the foundation has made 308 grants and investigators have been aided in 32 countries. Applications for assistance should arrive before May 1st, including statements about the nature of the investigation, the amount of money wanted, and the way in which it will be spent. The secretary of the executive committee is Dr. Joseph C. Aub, Collis P. Huntington Memorial Hospital, 695, Huntington-avenue, Boston, Massachusetts, U.S.A.

Educational Gymnastics and Keep-Fit Work

On Jan. 26th a demonstration of educational and recreative gymnastics for girls and women was given under the auspices of the Ling Physical Education Association at the County School for Girls, East Sheen, and at the Shillingfleet Church Hall, Barnes. Educational gymnastics were shown by senior girls of the county school under Miss V. M. Frost, who laid particular emphasis on the maintenance of free natural movement, on the correction of postural defects, and on the recreative element in school gymnastics. Recreative gymnastics were then demonstrated by the keep-fit class of the Army and Navy Stores under Miss Docking. The girls' daily work is chiefly sedentary, and the aims of the class are to ensure general enjoyment, good poise and posture, mobility combined with strength, and the development of good muscular tone and control. The scheme of work is based on Ling's Swedish system, with the addition of easy dances. Finally there was a demonstration by a keep-fit class for older women, taken by Mrs. Thompson. This consisted of women between the ages of 30 and 50, who have an hour's lesson on one afternoon a week. All the members lead busy lives, the great majority being housewives and mothers. Mrs. Thompson explained that the chief aims in classes for older women were to cultivate such beneficial qualities as grace, good figure, and poise, and to cure or ameliorate the physical deformities arising from many years of hard work. Easy and enjoyable corrective exercises were employed, carried out to music, as in all keep-fit classes.

The gymnastic work was followed by a discussion in which the medical visitors, gymnasts, and members of the classes took part.

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Hospitals for Civilian Casualties in Scotland

In considering arrangements to be made for civilian casualties caused by air-raids the Government has arranged for a survey of the hospital accommodation of the country (see *Lancet*, Jan. 22nd, 1938, p. 234). In Scotland the survey is being undertaken by the Department of Health. Lieut.-Colonel A. D. Stewart, M.B., superintendent of the Edinburgh Royal Infirmary, and Dr. J. C. Knox, medical superintendent of the Aberdeen Royal Infirmary, will assist the Department. The officers responsible include Dr. Thomas Ferguson, Dr. Ernest Watt, Dr. J. C. Knox, and Dr. Alexander Shearer. The General Board of Control for Scotland will undertake the survey of mental hospitals and mental deficiency institutions.

Better Treatment of Fractures

Speaking at Ipswich on Tuesday last Sir Kingsley Wood, the Minister of Health, spoke of the substantial proportion of incapacity represented by fractures and allied injuries. To-day considerably over 200,000 fractures were treated annually in hospitals up and down the country, and there was a general demand for a better service, inasmuch as only about a quarter of the cases were dealt with in departments organised in accordance with modern principles. Industry was particularly interested because the period of disability could be enormously reduced by modern methods of treatment. Workers could be saved much suffering and discomfort and the employers much dislocation of their business. The up-to-date fractures department at the East Suffolk and Ipswich Hospital, he said, was already proving of great benefit to the inhabitants of the borough and surrounding districts.

A Liverpool Cancer Campaign

The Associated Voluntary Hospitals Board has appointed a commission to report on the investigation and treatment of cancer in the Liverpool area, and on the possibility of extending and improving this work. Particular attention is to be paid to the best way of using and coördinating the available hospital and research facilities. The commission is also to decide whether any change is needed in the organisation, policy, or construction of the Liverpool Radium Institute and Hospital for Cancer. The following are the members of the commission: Dr. Arnold D. McNair (chairman), Prof. R. E. Kelly, Prof. Henry Cohen, Prof. James Chadwick, Prof. A. Leyland Robinson, and Mr. Roland H. Thornton, chairman of the Associated Voluntary Hospitals Board.

Medical Diary

February 14th to February 19th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY.—5.30 P.M., general meeting of fellows.
Pathology. 8.15 for 8.30 P.M., Laboratory meeting in the pathological department, St. Thomas's Hospital, S.E.
THURSDAY.
Dermatology. 5 P.M. (Cases at 4 P.M.) Dr. F. Sherry-Dottridge: (1) Scleroderma, (2) Case for diagnosis.
Neurology. 8.30 P.M., clinical meeting at the National Hospital, Queen-square, W.C.
FRIDAY.
Physical Medicine. 4.30 P.M., Dr. Wilfred Pearson: The Effects of Strain in Children. Dr. Nina Kellgren and Dr. J. B. Mennell will also speak.
Obstetrics and Gynæcology. 8 P.M., Prof. A. M. Carr-Saunders, Dr. R. R. Kuczynski, Mr. Eardley Holland, Dr. C. P. Blacker, Prof. J. C. Drummond, D.Sc., and Prof. J. Young: Medical Aspects of the Decline of the Population.
Radiology. 8.30 P.M., Dr. C. G. Teall, Dr. Campbell Golding, and Mr. A. T. Fripp: Deformities in the Region of the Hip-joint.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, Manson House, 26, Portland-place, W.
THURSDAY.—8.15 P.M., Dr. H. M. Hanschell and Dr. C. C. Chesterman (Belgian Congo): Climatic Bubo or Lymphogranuloma Inguinale. Dr. G. W. M. Findlay will also speak.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION
THURSDAY.—2.30 P.M. (11, Chandos-street, W.), Dr. S. Sharman: Some Observations on the Theory of Perception.

MEDICAL SOCIETY OF LONDON, 11 Chandos-street, W.
MONDAY.—8.30 P.M., Dr. J. H. Douglas Webster, Dr. W. M. Levitt, and Dr. G. E. Vilvandré: What Can be Expected of Deep X Ray Therapy.

BRITISH ASSOCIATION OF RADIOLOGISTS, 32, Welbeck-street, W.
FRIDAY.—4 P.M., Sir Walter Langdon-Brown: The Pursuit of Shadows. (Skinner lecture.)

BRITISH INSTITUTE OF RADIOLOGISTS, 32, Welbeck-street, W.
THURSDAY.—8.30 P.M., Mr. H. M. Parker: Uniform Irradiation in Interstitial Radium Therapy. Mr. A. Nemet and Mr. A. C. Gunstone: The Metrion Integrating Dosimeter.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Thornhaugh-street, W.C.
FRIDAY.—5 P.M., Dr. Hugh Paul: Present Practice in regard to Quarantine and Disinfection.

CHELSEA CLINICAL SOCIETY
TUESDAY.—8.30 P.M. (Rembrandt Hotel, Thurloe-place, S.W.), Dr. C. F. White: Quarantine, Past, Present, and Future.

NORTH LONDON MEDICAL AND CHIRURGICAL SOCIETY
THURSDAY.—5 P.M., visit to the Metropolitan Police Laboratory, Hendon.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn-fields, W.C.
MONDAY.—5 P.M., Sir Arthur Keith, F.R.S.: The Prehistoric People of Mount Carmel.
WEDNESDAY.—5 P.M., Dr. W. E. Gye: Some Recent Work in Experimental Cancer Research.

UNIVERSITY OF BIRMINGHAM
THURSDAY.—4 P.M., Sir Henry Dale, F.R.S.: Chemical Transmission of the Effects of Nerve Impulses. (First William Withering lecture.)

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland-place, W.C.
WEDNESDAY.—3.30 P.M., Dr. Henry Yellowlees: Mental Hygiene in Modern Life.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Prof. J. H. Dible: Pathology of Certain Respiratory Diseases. 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Dr. J. G. Greenfield: Neuropathology.
THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration. 3.30 P.M., Dr. Alan Moncrieff: Feeding of the New-born Infant.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Prof. Lambert Rogers: Surgery of the Spinal Cord and Peripheral Nerves.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
TUESDAY.—5 P.M., Dr. H. Corsi: Diseases of the Nails.
WEDNESDAY.—5 P.M., Dr. I. Muende: Histopathology of Some Common Skin Diseases. (Chesterfield lectures.)

ST. GEORGE'S HOSPITAL, S.W.
THURSDAY.—5 P.M., Dr. Antony Feiling: neurological demonstration.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY.—2 P.M., Dr. Alan Moncrieff: Rickets and Tetany. 3 P.M., Dr. W. W. Payne: Serum Calcium, Phosphorus and Phosphatase.
Out-patient clinics daily at 10 A.M., and ward visits at 2 P.M.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY.—3.30 P.M., Mr. G. Elmquist: Demonstration of Remedial Exercises.
TUESDAY.—3.30 P.M., Dr. J. P. Martin: Neurosyphilis (3).
WEDNESDAY.—3.30 P.M., Dr. F. M. R. Walshe: clinical demonstration.
THURSDAY.—3.30 P.M., Dr. C. Hinds Howell: Myelitis.
FRIDAY.—3.30 P.M., Dr. J. St. C. Elkington: Acute Infectious Disease of the Brain.
Out-patient clinic daily at 2 P.M.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY.—4 P.M., Mr. Archer Ryland: Demonstration of Museum Specimens.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL, N.W.
WEDNESDAY.—4 P.M., Dr. Wilfred Pearson: Indigestion in Infancy.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.
FRIDAY.—4.30 P.M., Dr. Philip Ellman: Physical Medicine in Emphysema, Chronic Bronchitis, and Bronchiectasis.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY to SATURDAY.—CHELSEA HOSPITAL FOR WOMEN, Arthur-street, S.W., all-day course in gynæcology. F.R.C.S. (PRIMARY) COURSE IN PHYSIOLOGY: Mon., Wed., and Fri., at 5.30 P.M.—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in dermatology. (Open to non-members.)—PRINCESS ELIZABETH OF YORK HOSPITAL, Shadwell, E., all-day course in children's diseases.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, S.W.
WEDNESDAY.—4 P.M., Mr. Zachary Cope: Actinomycosis.

LEEDS GENERAL INFIRMARY.
TUESDAY.—3.30 P.M., Dr. William MacAdam: Some Recent Advances in Endocrinology.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY.—4.15 P.M. (Royal Maternity and Women's Hospital), Dr. R. A. Lennie: Antenatal Care.

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Vacancies

For further information refer to the advertisement columns

Belfast, Queen's University.—Lecturer in Anatomy, £450.
Birkenhead, Clatterbridge (County) General Hosp.—Jun. Res. Asst. M.O., at rate of £200.
Birmingham, Selly Oak Hosp.—Jun. M.O., at rate of £200.
Blackburn County Borough.—Asst. M.O.H., £600.
Braintree, Black Notley Sanatorium.—Jun. Asst. M.O., £250.
Cambridge, Addenbrooke's Hosp.—H.S., at rate of £130.
Cannock Urban District Council.—Asst. M.O.H. and Asst. School M.O., £550.
Canterbury, Kent and Canterbury Hosp.—Hon. Dermatologist.
Cardiff, Welsh National School of Medicine.—Three Scholarships, £200, £150, and £150.
Carlisle, Cumberland Infirmary.—H.P., two H.S.'s, and H.S. to Spec. Depts., each at rate of £160.
Central London Ophthalmic Hosp., Judd-street, W.C.—Sen. and Jun. H.S., £120 and £100 respectively.
Central London Throat, Nose, and Ear Hosp., Gray's Inn-road, W.C.—Third Res. H.S., at rate of £75. Also Assts. in Out-patient Dept.
Charing Cross Hosp., W.C.—Surg. Reg., £150.
Chatham, County Hosp.—Cons. Physician and Cons. Surgeon, each £170.
Chesterfield and North Derbyshire Royal Hosp.—Cas. O. and Fracture H.S., at rate of £200.
Chichester, West Sussex County Mental Hosp.—Med. Supt., £1100.
Derbyshire County Council.—Asst. County M.O.H., £700.
Doncaster Royal Infirmary and Dispensary.—Cas. H.S., £175.
Douglas, Noble's Isle of Man Hosp. and Dispensary.—Res. H.S., £175.
Eastbourne, Royal Eye Hosp.—H.S., £100.
Edgware, Redhill County Hosp.—Physician, Grade I, £1000.
Elizabeth Garrett Anderson Hosp., Euston-road, N.W.—Med. Reg., £100.
Folkestone Royal Victoria Hosp.—Hon. Anæsthetist.
Fulham Metropolitan Borough Maternity Home and Clinic.—Res. M.O., &c., £350.
Glasgow Corporation Mental Hosps.—Jun. Asst. M.O. for Hawkhead Mental Hosp., £300.
Gloucestershire Royal Infirmary, &c.—H.S. to Ear, Nose, and Throat Dept., at rate of £150.
Gravesend Borough.—Asst. M.O.H. and School M.O., £600.
Hellingly, East Sussex County Mental Hosp.—Jun. Asst. Res. M.O., £350.
Herefordshire General Hosp.—H.S. to Cas. and Ear, Nose, and Throat Depts., £100.
Hosp. for Diseases of the Skin, Blackfriars, S.E.—Clin. Assts. Also Member for Hon. Staff.
Hosp. for Sick Children, Great Ormond-street, W.C.—Res. Aural Reg., £150.
Huddersfield, Bradley Wood Sanatorium.—Res. M.O. and Asst. M.O.H., £600.
Huddersfield County Borough.—Asst. School M.O., £500.
Hull Royal Infirmary.—Second Cas. O., at rate of £150.
Isleworth, West Middlesex County Hosp.—Obstet. Surgeon, Grade II, £650. Also Res. Cas. M.O., at rate of £350.
Kettering and District General Hosp.—Cons. Physician. Also H.P., at rate of £150.
Kingston County Hosp.—Res. Asst. M.O., at rate of £250.
Lancashire County Council.—Asst. County M.O., £800.
Leamington Spa, Warneford General Hosp.—Res. Cas. O. and H.S., at rate of £150.
Leeds City.—Asst. M.O., £500.
Leeds Public Dispensary and Hosp.—H.P., at rate of £1 50.
Leicester City General Hosp.—Two Res. M.O.'s, each at rate of £300.
Liverpool University.—Two Demonstratorships in Physiology, each £300.
Lochgilphead, Argyll and Bute District Mental Hosp.—Res. Asst. M.O., £300.
London County Council.—Asst. M.O., Grade II, £250.
London Homœopathic Hosp., Gt. Ormond-street, W.C.—H.S. and Gynæcological H.S., each at rate of £100.
London Hosp., E.—Physician. Also Asst. Physician.
London Lock Hosp., 283, Harrow-road, W.—Res. M.O., at rate of £175.
London University.—University Readership in Embryology, £750.
Maidstone, West Kent General Hosp.—H.S., £175.
Manchester, Ancoats Hosp.—Cas. O., £175.
Manchester Royal Children's Hosp., Pendlebury.—Two Asst. M.O.'s to Out-patients' Dept., each at rate of £150.
Manchester University.—Sir Henry Royce Fellowship, £500.
Marie Curie Hosp., 2, Fitzjohn's-avenue, N.W.—Res. M.O., £100.
Merthyr Tydfil County Borough.—Asst. M.O.H. and Asst. School M.O., £500.
Metropolitan Hosp., Kingsland-road, E.—Cas. O. and Res. Anæsthetist, £100.
Miller General Hosp., Greenwich-road, S.E.—Cas. O., at rate of £150. Also H.P. and H.S., each at rate of £100.
Newcastle General Hosp.—H.S. and Jun. Clin. Asst. to Joint Committee's V.D. Clinic, £250.
Newcastle-upon-Tyne Education Committee.—Asst. School M.O., £500.
Newcastle-upon-Tyne, Royal Victoria Infirmary.—Hon. Asst. Surgeon.
Norfolk, Kelling Sanatorium, Holt.—Second Asst. Res. M.O., £350.
Nottingham Children's Hosp.—Res. H.P. and Res. H.S., each at rate of £150.
Plymouth City General Hosp.—Asst M.O., £300. Also Jun. Asst. M.O., at rate of £250.
Plymouth, Prince of Wales's Hosp., Greenbank-road.—Res. Anæsthetist and H.S. to Spec. Depts., at rate of £120.
Prince of Wales's General Hosp., N.—Hon. Med. Reg., £100. Also Jun. H.P. and two Jun. H.S.'s, each at rate of £90.
Queen Mary's Hosp. for the East End, E.—Hon. Asst. Obstet. and Gynæcological Surgeon.
Queen's Hosp. for Children, Hackney-road, E.—Clin. Asst. to Med. Out-patients, 5s. per attendance.
Royal Air Force Medical Service.—Commissions in Medical Branch.
Royal Eye Hosp., St. George's-circus, S.E.—Sen. H.S. and two Asst. H.S.'s, at rate of £150 and £100 respectively.
Royal Free Hosp., Gray's Inn-road, W.C.—Res. Cas. O., at rate of £150.
Royal London Ophthalmic Hosp., City-road, E.C.—Sen. Res. O., at rate of £150.
Royal Naval Medical Service.—M.O.'s.
Royal Waterloo Hosp. for Children, &c., Waterloo-road, S.E.—Anæsthetist, £52.
Runcorn, Cheshire, Evans Biological Institute.—Sen. Bacteriologist.
St. Bartholomew's Hosp., E.C.—Chief Asst. in X Ray Diagnostic Dept., £400–£500. Also Dental H.S., at rate of £80.
St. Helens Hosp.—Jun. H.S., £150.
St. John Clinic and Institute of Physical Medicine, Ranelagh-road, S.W.—Med. Reg., £200.
St. John's Hosp., Lewisham, S.E.—Res. Surg. O., £200.
Salisbury General Infirmary.—H.S., at rate of £125.
Scotland, Department of Health.—Two Regional M.O.'s, each £800. Also two M.O.'s, each £750.
Southampton Children's Hosp., &c.—Res. M.O., at rate of £150.
Southend Municipal Hosp.—Asst. M.O., £325.
South London Hosp. for Women, Clapham Common, S.W.—Clin. Assts.
South Shields, Ingham Infirmary.—H.S., £150.
Staffordshire General Infirmary.—Second H.S., £175.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—H.S., at rate of £150.
Surrey County Council.—Asst. M.O., £600.
Swansea General and Eye Hosp.—Asst. Pathologist, £500.
Tancred's Studentships.—Each £100.
Tunbridge Wells, Kent and Sussex Hosp.—H.P., £150.
West London Hosp., Hammersmith-road, W.—Med. Reg., £100. Also Res. Anæsthetist, at rate of £100.
Westminster Hosp., Broad Sanctuary, S.W.—Physician.
Willesden General Hosp., Harlesden-road, N.W.—Gynæcological Registrar.
Windsor, King Edward VII Hosp.—H.S., £120.
Medical Referee under the Workmen's Compensation Act, 1925, for the Berwick-upon-Tweed County Court District (Circuit No. 1). Applications should be addressed to the Private Secretary, Home Office, Whitehall, London, S.W.1, before March 3rd.

Appointments

BUXTON, R. G., L.R.C.P. Edin., D.C.O.G., Assistant Medical Officer of Health for Eccles.
*CAMERON, J. A. M., M.D. Manch., F.R.C.S. Edin., Resident Medical Officer at the Radium Institute, London.
FITZGERALD, F. P., M.B. Dubl., F.R.C.S.I., Fracture Officer and Orthopædic Registrar at the Royal Northern Hospital, London.
HOWAT, H. T., M.B. St. And., M.R.C.P. Lond., Resident Medical Officer at Manchester Royal Infirmary.
LEWIS, E. E., F.R.C.S. Eng., Surgical Registrar at King's College Hospital.
LYNCH, G. A. C., M.D. Liverp., D.P.H., Assistant Medical Officer of Health for Burnley.
ROBIN, I. G., M.B. Camb., F.R.C.S. Eng., Second Ear, Nose, and Throat Surgeon to the Royal Northern Hospital, London.
RYCROFT, G. J., Barrister-at-law, City Coroner of Manchester.
TALBOT, G. G., M.B. N.Z., F.R.C.S. Eng., Part-time Ophthalmic Surgeon at Ealing Health Centres.
WHYTE, A. HEDLEY, M.S. N.Z., F.R.C.S. Eng., Hon. Surgeon to the Royal Victoria Infirmary, Newcastle-upon-Tyne.

Colonial Medical Service.—The following appointments and promotions are announced :—
FINLAYSON, D. I. C., M.B., F.R.C.S. Edin., M.C.O.G., Assistant Surgeon at the Public Hospital, Georgetown, British Guiana ;
JONES, G. F., M.B. Lond., Medical Officer, Malaya ;
PORTER, G. E. J., M.R.C.S. Eng., District Medical Officer, Cyprus ;
RUSSELL, P. W. DILL, M.R.C.S. Eng., District Medical Officer, Cyprus ; and
BELL, P. S., M.B., M.R.C.P. Lond., D.T.M. & H., Senior Medical Officer, Somaliland.

Hospital for Sick Children, Great Ormond-street.—The following appointments are announced :—
COPE, R. W., M.R.C.S. Eng., D.A., Anæsthetist ;
HARRIS, J. R. G., M.B., D.A., Anæsthetist ;
EDWARD, D. G. FF., M.D. Lond., Assistant Pathologist ; and
WILLIAMS, J. R. C., M.B., Casualty Officer.

West London Hospital.—The following appointments are announced :—
DAVENPORT, R. C., M.B. Lond., F.R.C.S. Eng., Ophthalmic Surgeon ;
MOFFATT, P. MCG., M.D., M.R.C.P. Lond., F.R.C.S. Eng., D.O.M.S., Assistant Ophthalmic Surgeon ;
STEWART, T. GRAINGER, M.D. Edin., F.R.C.P. Lond., Consulting Neurologist ; and
GIBB, H. P., M.B. Camb., F.R.C.S. Eng., Consulting Ophthalmic Surgeon.

Medical Referee under the Workmen's Compensation Act, 1925, for the Whitehaven and Millom ; and Workington and Cockermouth County Court Districts (Circuit No. 3) : Dr. ALEXANDER GIBSON HENDERSON.

* Subject to confirmation.

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NOTES, COMMENTS, AND ABSTRACTS

AN INTERNATIONAL PHARMACOPŒIA

WITH a view to the international unification of pharmacopœias the council of the League of Nations has just appointed a technical commission of pharmacopœia experts. The commission is constituted of eight members representing Great Britain, Denmark, Belgium, France, Switzerland, Holland, the United States, and Soviet Russia. The chairman is Dr. C. H. Hampshire, secretary of the British Pharmacopœia Commission. The work of this commission will be in the first place to prepare a programme of studies, including the selection of suitable drugs for examination and the determination of a uniform method of analysis, assay, and preparation of the drugs selected. The technical examination will then be distributed among a number of national pharmacopœia commissions. It is intended that the results of the studies thus carried out shall take the form of a series of monographs on the different drugs. These monographs would be forwarded to the permanent secretariat in Brussels for circulation among the parties to the International Agreement for the Unification of Pharmacopœial Formulas for Potent Drugs of 1929 with a view to their being adopted internationally and eventually incorporated into an international pharmacopœia of powerful remedies. Thus a very important step has been taken towards the compilation of an international pharmacopœia and the selection of Dr. Hampshire as chairman of the new commission inspires confidence in its future.

PORTRAITS OF THE HUNTERS

A NOTE in THE LANCET of Dec. 7th last, about the Reynolds portrait of John Hunter, prompted an inspection of some other portraits of the brothers Hunter in the Royal College of Surgeons, two of William and one of John.

The last is by his brother-in-law, Robert Home. It shows John as a young, reddish-haired man. Unlike the Reynolds portrait it is a plain, simple, unimaginative depiction of the man in working garb as he appeared to his fellows in the laboratory from day to day. It is easy to perceive in it those qualities, self-reliance, dour persistence, uncouthness, pugnacity, that marked his career and not only enabled him as a great experimental physiologist to carry on his many and various inquiries into normal and morbid processes, but were responsible for his strained relations with his brother and with his professional colleagues, and his offensive rudeness to his wife and her guests. His ultimately fatal malady served to aggravate his lack of social grace.

In the picture there seems to be a suggestion of slight enlargement of the first interphalangeal joints of the fore and ring fingers. These may have been "anatomist's warts." Hunter looks young for rheumatoid arthritis. He was said to have suffered from gout, a most unlikely thing. His heredity and upbringing were remote from those typical of gout, and his habits were abstemious. "Gout" was often in the eighteenth century, like "influenza" in the twentieth, a diagnostic omnium gatherum, a convenient label for any illness the nature of which was not at once apparent, a very present help to the doctor harassed by the pressing inquiries of the patient's anxious and insistent friends. It was often "suppressed," and liable to "fly to the heart," and thus served to explain any painful condition in thorax or abdomen about or after middle age. And John Hunter had syphilis (self-inoculated) and angina pectoris.

Of the two portraits of William, that by R. E. Pine gives an impression of soft prettiness in sharp contrast to the alert vigour shown in the Reynolds (Glasgow University), the Chamberlin (Royal Academy), and the Zoffani (Royal College of Physicians) pictures. It is interesting to see that two of the joints of the right hand show enlargements quite as likely to be due to rheumatoid arthritis as to the gout from which William, like John, is said, with more reason, to have suffered.

The second portrait of William was described in the first edition of the College catalogue as "painted by Johann Zoffani"; in the later edition it is "ascribed to" him, indicating that a doubt of its authenticity had arisen. That doubt might well have been carried farther and Zoffani's name been dropped entirely. The picture is evidently a good copy by an unknown hand of the Reynolds portrait in the Hunterian museum at Glasgow University. That portrait was painted about 1780, three years before William's death. At that time Zoffani was a popular and fashionable portrait-painter, much more profitably engaged than in that copying of other men's work which he had been glad to do in his early days of hungry struggle in London.

The picture shows William as a little, dapper man, neat and pernickety in his dress, quick of movement, very much alive, clear and orderly, conscious of his position, not likely to allow himself to be "put upon," and withal possessed of strength and pugnacity; a Sir Peter Teazel endowed with force and determination, a pertinacious little man, not small. Unlike John, William was a bachelor, a clubbable man. We know of no amatory passage in his life; His attentions to the ladies were obstetric, not matrimonial.

One has only to look at this portrait and that of John by Home to understand the brothers' quarrel and its long endurance. Neither was of the yielding kind; each had the lowland Scot's long memory for a "difference." We may feel sure that John's visit to his brother's deathbed and his catheterising of him afforded him a grim satisfaction, a pleasing feeling of heaping coals of fire without any attendant childish nonsense about reconciliation with a William too weak and ill to do anything but accept the urgently needed relief. They were a dour pair; insatiable inquirers, hard workers, enduring haters, and persistent fighters. Didactic assertion, pertinacious argument were in the blood. They had the strength and the defects of their qualities, and by these they did their great work and lived their lives.

HOSPITAL LIBRARIES ABROAD

ALTHOUGH the British Red Cross Society and the Library Association have done much in recent years to improve the library service in hospitals the value of books to patients does not yet seem to have received the same recognition here as in some other countries. In the United States the organisation has been developed under professional direction and the hospital library is a definite branch of library work. The librarian of the Ann Arbor University Hospital, Miss A. H. Moisio, in the January issue of the *Library Association Record* gives a description of the service rendered to the 30,000 patients received there annually. Every effort is made to study and meet individual needs. In the tuberculosis unit, for example, "cultured and formative reading" is found to be most acceptable. Among the numerous examples cited of direct benefit derived by patients is one of a young woman whose muscle function was greatly limited by poliomyelitis. The librarian discovered that she had an unusual interest in cathedrals while the occupational therapist directed her to needlepoint. The result of this combined attention was that she produced a beautiful cathedral done in needlepoint—"a rare piece of perfect needlework"—and so found a means of self-expression. Stress is laid by Miss Moisio upon the importance of having books attractive in size, form, and outward appearance. The library service for the hospitals in Paris has reached a high standard of excellence in this respect. Dr. Louis Mourier, Director-General of the

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Public Assistance in Paris, devotes a section to the description of the hospital libraries in the beautifully illustrated survey of the work of public assistance from 1920 to 1937, which has just been published by his department. The organisation is not based upon the hospital as a unit but upon the needs of each department. Infectious diseases must naturally be separated and usually maternity units are outside the general scheme. The patient suffering from cardiac trouble has a supply different from that provided for surgical cases and so on throughout the hospital. The voluntary helpers directed by professional librarians are required to know the contents of the books so that they may be able to provide the reading most suitable for the patient. The appreciation of the patients is demonstrated by the fact that in a circulation of 100,000 in a year not one has been destroyed or disfigured, and the loss has been less than one in a thousand. It is safe to say that there is no hospital in England which can approach to that record. The library service in the hospitals in Paris leads the way in France and possesses features which may well inspire admiration and emulation in this country.

RABIES IN VENEZUELA

LAST year a small outbreak of rabies was observed in the State of Táchira (Venezuela) by the medical officer of health, A. J. González, who has given a description of the cases.[1] Between the months of April and July 6 persons, ranging in age from six to fifty years, were admitted to hospital with rabies, and all of these died. Another 85 presented themselves for bites from animals suspected to be rabid. To 70 of these people a full course of prophylactic inoculations was given; the remaining 15 were not treated, for the supply of vaccine available was limited and the histories of these 15 cases were not, in the opinion of González, sufficiently definite to justify the use of any of it for them. None of them developed rabies. The plan proposed by González to prevent future catastrophes of this kind is compulsory prophylactic inoculation of all dogs. After the completion of the treatment a medal is fixed to the dog's collar. Any dog not wearing such a medal can then be seized and destroyed by the local authorities.

OPIUM AND COCAINE

THE report of the Permanent Central Opium Board of the League of Nations on its work during 1937 and on the statistics of narcotics for 1936 affords valuable information. It is a document of 185 pages with statistical tables and graphs showing the consumption per million inhabitants of morphine, heroin, and cocaine from 1932 to 1936. At its quarterly sessions the Board examines discrepancies between imports and exports of narcotics furnished by governments, and investigates whether the obligations of the countries which are parties to the several opium conventions and the convention of 1931 limiting the manufacture and distribution of narcotic drugs are faithfully complied with. Thus the stocks of raw opium reported by the Turkish authorities as in hand at the end of 1936 were 476,065 kg. instead of 820,870 kg. The attention of the Turkish government having been directed to this discrepancy, the Board received the assurance that "steps to fill the permanent gap in the system of supervision due to the exemption from control of opium within the country will shortly be taken."

Attention is called to the fact that in 1936 the world manufacture of drugs showed a general increase over the 1935 figures amounting to 30 per cent. in the case of heroin, 22 per cent. in the case of codeine, 6 per cent. in the case of cocaine, and of "unconverted" morphine of 2 per cent. The amount of morphine used for conversion into other drugs rose from 21,807 kg. in 1935 to 27,708 kg. in 1936—i.e., by 27 per cent. Increases of over one ton occurred in Soviet Russia, the United States, and France; the total increase for these three countries represented 68 per cent. of the increase for the whole world. Attention is called to the undesirably large stocks of raw opium in Macao and to the fact that in 1935 and 1936 much more opium was imported than was consumed in the colony in the shape of prepared opium (for smoking).

The report on the world stocks of coca leaves is vitiated by the fact that no stock returns have been received by the Board from Bolivia or Peru, both of which are important producing countries.

An interesting table is furnished showing the calculated yields of morphine from opium. The percentages varied in 1936 from 6·73 in Soviet Russia to 13·88 in Japan. For the United Kingdom it was 12·24. From an appended graph it appears that from 1932 to 1936 the consumption of morphine per million of the population was highest in Kuantung, Denmark, and Iceland. Next in the series come Norway, the United States, and Japan. Finland and Japan appear to give the highest records for the consumption of heroin per million inhabitants.

[1] *Bol. Minist. Sanidad Asist. Soc.* Estados unidos de Venezuela, 1937, 1, 1144.

NEW TRYPANOCIDES

IN the January issue of the *Journal of Pathology and Bacteriology* Prof. C. H. Browning, F.R.S., in collaboration with G. T. Morgan, J. V. M. Robb, and L. P. Walls, reports on the trypanocidal action of certain phenanthridinium compounds. Two of these were found to be trypanocidal, doses approaching the maximum tolerated being curative for mice infected with *Trypanosoma brucei* when administered 24 hours after inoculation. Both compounds act on arsenic-fast strains of *T. brucei* and it is of interest that one of them, unlike most other trypanocides, influences *T. congolense* as much as *T. brucei*. The second preparation is without effect on *T. brucei*, it has some action on *Spirillum minus*.

BARON ALIBERT

THE January issue of the *Proceedings of the Royal Society of Medicine* contains a paper by Dr. J. D. Rolleston on the life and work of Baron Alibert read before the section of dermatology on the centenary of his death on Nov. 4th, 1837. Alibert occupies much the same position in the history of French medicine that Willan does among us, both being the founders of modern dermatology in their respective countries. Brought up like Trousseau to be a teacher of literature, he changed his plans at the French Revolution and took up medicine, qualifying in 1799 with a remarkable thesis on pernicious fevers which went through five editions. His rise in the profession was exceptionally rapid, as three years after qualification he was made full physician to the Hôpital Saint-Louis, which he made one of the most celebrated dermatological centres in the world. In addition to his works on diseases of the skin, of which the most famous, entitled "Description des maladies de la peau observées à l'Hôpital Saint-Louis et exposition des meilleures méthodes suivies pour leur traitement," appeared in parts between 1806 and 1814, he was a pioneer in hydrology and was the author of several works on therapeutics, of which he was the first professor in the Paris faculty of medicine. He also made numerous contributions to periodical literature not only on dermatology and therapeutics but also on biography and belles lettres. His "Physiologie des Passions," first published in 1825, of which a fourth and posthumous edition appeared in 1861, won him the Montyon prize and was translated into German and Spanish. Dr. Rolleston illustrated the high esteem in which Alibert was held not only in France but also in this country by the obituary notices that appeared in the *Gentleman's Magazine*, which gave an intimate picture of the man, and in the *London Medical and Surgical Journal*. Alibert's name is always associated with the "tree of dermatoses," a classification in which he sought to do for

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skin diseases what de Jussieu had done for plants. The classification however was subjected to severe criticism, especially by Bateman, though Gaucher described it as the first draft of a scientific and methodical study of the skin. Dr. Rolleston attributed Alibert's high rank in the history of French medicine and of dermatology in particular to the following causes. In the first place he established the first independent clinic of dermatology in France. Secondly, he described several new diseases such as mycosis fungoides, Aleppo boil, keloid, seborrhœa, and scleroderma. Thirdly, he introduced the terms "dermatosis," "dermatolysis," and "syphilides," which found a permanent home in dermatological nomenclature as well as many others which have not survived. Fourthly, though not to be compared with Trousseau, his successor in the chair of therapeutics, he made many valuable contributions to this branch of medicine. Fifthly, he was the first to introduce coloured illustrations into dermatological works. And lastly, he made the Hôpital Saint-Louis the Mecca of dermatologists throughout the world.

FACILITIES FOR RADIUM TREATMENT

THE secretary of University College Hospital writes: There is a certain amount of time available for the treatment of cases of malignant disease, other than patients of the hospital, with the two-gramme mass unit of radium. It is particularly suitable for the irradiation of superficial carcinoma, growths of the mouth and pharynx, and glandular fields. Applications for the treatment of patients should be sent to the Harker Smith Registrar.

NEW PREPARATIONS

CARBOMUCIL is a preparation of activated charcoal in granules containing a central core of the desiccated vegetable mucin sold by the manufacturers (H. R. Napp Ltd., 3, Clements-inn, London, W.C.2) under the name of Normacol. The advantages claimed for Carbomucil are (1) that very little of it disintegrates before reaching the bowel, where its adsorbent action is required; (2) that it forms a soft gelatinous mass which is well mixed with the intestinal contents and is thus brought into "complete contact with the toxic agents"; and (3) that, unlike ordinary charcoal, it favours defæcation rather than constipation. Its use is recommended "in all toxic conditions of the intestinal tract," including dysentery and diarrhœa.

STAPHYLOCOCCUS ANTITOXIN (REFINED AND CONCENTRATED).—Parke, Davis and Co. (Beak-street, W.1) prepare this antitoxin in bulbs, each of which contains 10,000 international units. In ordinary staphylococcal infections it is suggested that 10,000 to 20,000 units will suffice, but in more severe cases from 50,000 to 100,000 units may have to be given during the first twenty-four hours. The antitoxin is usually administered intramuscularly, but intravenous injections may be resorted to when immediate neutralisation of toxin seems imperative.

AZOCHLORAMID is described as a "chlorine germicide, odourless, non-irritating, and non-selective in bactericidal action," for dressing, packing, and irrigating infected wounds, cavities, and abscesses. It is a complex aliphatic organic chloramine (N-N'-dichloroazodicarbonamidine) soluble in water and fats, oils, alcohols, ketones, and esters. Its special property is the extremely slow rate with which it liberates chlorine; it is said to remain potent for long periods in the presence of organic matter, and chlorine is found in considerable quantities in Azochloramid solutions removed after 24 hours in the pleural cavity. This exceptional stability reduces the number of dressing changes required. The preparation is available as a solution in triacetin, for application to wounds, and in a saline mixture for making irrigating solutions. It is sold by Wallace and Tiernan Ltd., Power-road, Gunnersbury, W.4.

The flavour and the friability of Ostocalcium Tablets, supplied by GLAXO LABORATORIES LTD. (Greenford, Middlesex), has been improved. Calcium phosphate (2½ grains) has been added to the original formula (7½ grains calcium sodium lactate and 500 international units of vitamin D). It is stated that each Ostocalcium Tablet now supplies 1½ grains (0·1 gramme) of calcium.

LABORATORY NATIVELLE LTD. (North Circular-road, N.W.2) inform us that Nativelle's Digitaline is now supplied in tablets, 1/600 grain (pink) and 1/240 grain (white). Nativelle's Granules and Solution are still available.

ZERMOPAD LTD. (4, Queen Victoria-street, E.C.4) make a sachet partly filled with powder which rises to a temperature of 140°–170° F. on the addition of a tablespoonful of water and remains hot for periods up to 10–14 hours. The life of the pad is about 60 hours, and it is a convenient application where local heat is required. The manufacturers ask us to say that they will send a Zermopad to any practitioner who thinks it might alleviate pain in a case of malignant disease under his care.

ANNUAL CHARITIES REGISTER, 1938.—We have received from Messrs. Longmans, Green and Co., a copy of the forty-fifth edition of the Annual Register of Charities and Public Institutions of the metropolis (Pp. 530, 8*s.* 6*d.*) which they publish for the Charity Organisation Society. On the cover it is stated with truth that the book is "indispensable for the service of persons in all kinds of trouble and need." Details of more than 2700 institutions and societies are given, and the classified list of contents shows the scope of the survey. Its thirty-nine sections include chapters describing facilities for the care of the blind, of the deaf and dumb, and of old people; others give lists of general and special hospitals, and of convalescent institutions; while other headings include pensions, maternity and child welfare, emigration, and social work among the unemployed. There is a general index at the end of the book.

Births, Marriages, and Deaths

BIRTHS

BOWESMAN.—On Feb. 4th, at Billericay, the wife of Dr. R. Bowesman—a son.

CHIESMAN.—On Feb. 3rd, at Egerton-gardens, S.W.3, the wife of Dr. W. E. Chiesman—a daughter.

FITZGERALD.—On Feb. 5th, at Nuffield House, London, the wife of Dr. J. A. K. Fitzgerald, Colonial Medical Service—a daughter.

PASSMORE.—On Feb. 2nd, at Coonoor, S. India, the wife of Dr. R. Passmore—a son.

ROBB.—On Dec. 31st, 1937, at 41, Symonds-street, Auckland, New Zealand, to Helen, wife of Douglas Robb, F.R.C.S.—a daughter.

MARRIAGES

FABER—WATSON.—On Feb. 3rd, at St. Mary's Church, Welwyn, Herts, Hamilton S. Faber, M.R.C.S., to Jean Ogilvy, daughter of Captain D. C. O. Watson, of Welwyn.

THORNE—LESLIE.—On Feb. 2nd, at St. Mary's, Twickenham, Lieut. William Thorne, I.M.S., to Sylvia May, daughter of Capt. G. H. Leslie, of Hampton Hill.

DEATHS

COURT.—On Feb. 8th, Sir Josiah Court, M.R.C.S. Eng., J.P., of Staveley, Derbyshire, in his 98th year.

HAWTHORN.—On Feb. 4th, Henry William John Hawthorn, M.R.C.S. Eng., L.D.S., of Wellington, Shropshire.

HENSTOCK.—On Feb. 3rd, at De Vere-gardens, W., John Lea Henstock, M.R.C.S. Eng., late of Vina del Mar, Chile.

HODDER.—On Feb. 3rd, at Stafford, Andrew Edward Hodder, D.S.O., M.B. Camb.

JONES.—On Feb. 4th, at Campden Hill-court, W., David Llewellyn Jones, F.R.C.S. Eng., aged 80.

NITCH-SMITH.—On Feb. 3rd, at Ealing, Reginald Nitch-Smith, M.R.C.S. Eng., aged 69.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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ADDRESSES AND ORIGINAL ARTICLES

PULMONARY TUBERCULOSIS

RELATION OF CHILDHOOD INFECTION TO THE DISEASE IN ADULTS *

BY ARVID WALLGREN, M.D.

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AFTER having made the diagnosis of a fresh tuberculous infection in a child, we proceed inter alia to consider the prognosis. This is of greatest importance to the parents. It is our duty, therefore, to try to answer their anxious question: "What is going to happen to our child now and in the future?"

In regard to the risk of a tuberculous infection, the child has, broadly speaking, to pass through two essentially different danger periods. The first is directly connected with the primary infection, the second appears much later in adult years. During the first danger period, which is brief and usually lasts but a few months, the child is threatened by miliary tuberculosis or tuberculous meningitis. During the second period, which does not begin before puberty and usually lasts for two or three decades, the infected individual may become prey to the adult type of pulmonary tuberculosis. Between these two periods he usually passes through a quiescent interval, which is longer the younger the child when infected.

The First Danger Period

In spite of the most favourable conditions for the early diagnosis and appropriate treatment of primary tuberculosis, a certain number of children succumb during the first stage. Thus among 453 infants and children up to the age of 16 years, who had been under observation and treatment from the onset of the primary tuberculosis, 35 (7·7 per cent.) died within the first few months.

The extent of the risk that a tuberculous child runs, however, is not equally great in all children. In some of them we reckon in advance with a considerable risk, while in others it is minimal. The deciding factor is the age—the younger the child the worse the prognosis. Most deaths occur during the first three years. The following is the mortality-rate of the above-mentioned 453 children arranged according to different age-groups:

Age-groups ..	0–1	–3	–7	–16	Total.
Number of children	39	64	225	125	453
Mortality-rate (%)	35·9	15·6	4·4	0·8	7·7

The main causes of death were miliary tuberculosis and tuberculous meningitis. It is well known that these disease entities can occur at any time during tuberculosis. They display, however, a marked predisposition to appear close upon the first manifestation of the primary infection. The interval between this event and the occurrence of tuberculous meningitis is as follows:

	Weeks.				Months.							Total.
Interval ..	1	2	3	4	1–2	–3	–4	–5	–6	–7	–13	
Cases ..	0	3	0	12	25	12	4	2	3	2	1 ..	64

From this it appears that most cases of tuberculous meningitis occur 1–2 months after the first manifestation of primary tuberculosis. Tuberculous meningitis seldom occurs later than 3 months after the primary infection has manifested itself. The rarity of this complication occurring at a later date gives us little cause to reckon with its occurrence, and this is also true of miliary tuberculosis. We may, therefore, conclude that the first three months after the onset of primary tuberculosis is the first danger period, since children under 3 years of age are essentially threatened by a fatal attack of tuberculous disease during this period.

Tuberculous meningitis and miliary tuberculosis result when the tubercle bacillus enters the blood stream. Their occurrence principally during the first few months after manifestation of the tuberculous infection indicates that blood-stream infection is fairly common at this stage of tuberculosis. Experimental evidence on animals supports this opinion, inasmuch as bacillæmia is more or less constantly occurring during the earliest stages after the infection. A hæmatogenous spread of bacilli may also occur later, but never with the frequency observed shortly after the manifestation of the primary infection. Observations on man confirm the quasi-constant hæmatogenous bacillary spread during the primary stage and its rarity during later stages of tuberculosis.

A hæmatogenous spread of tubercle bacilli need not necessarily be associated with miliary tuberculosis. The occurrence of miliary tuberculosis depends largely on the child's resistance and reaction towards the infection. Most people do not react noticeably to a hæmatogenous spread, and there are usually no clinical manifestations. The tubercle bacilli produce, however, multiple and microscopic foci or deposits of bacilli, which may be found anywhere in the organism. If this conception is correct, we may always expect a pulmonary tuberculous condition, irrespective of the site of the primary focus. These foci are a constant threat, since they may be starting-points for new tuberculous lesions, and pulmonary tuberculosis may arise from them when the subject reaches the second danger period.

The Disease in the Adult

Pulmonary tuberculosis of adult type only rarely occurs before puberty, but then its incidence increases. The following is the distribution of 403 cases of pulmonary tuberculosis of adult type on different age-groups:

Age-groups	0–5	–10	–15	–20	–25	–30	–35	–40	–45	–50	–55
No. of cases..	0	2	22	118	108	66	36	23	19	5	4

It is not before the age of 45–50 that the incidence of consumption decreases. It is seen that the years between 10–15 and 45 constitute the second danger period of tuberculosis.

Immunity

When an adult infected during childhood acquires pulmonary tuberculosis, the question arises as to the connexion between the childhood infection and the pulmonary tuberculosis. The disease cannot develop as a direct and immediate consequence of the primary infection, which differs essentially from the ordinary adult phthisis whose course presupposes that the lung tissue reacts to the tubercle bacilli in a manner different from what it does in a previously uninfected individual. This altered mode of reactivity toward the tubercle bacillus is brought about by the first infection, which is prerequisite for the development of this type of pulmonary tuberculosis.

Some authors believe that pulmonary tuberculosis of adult type requires two different infections: a

* Ingleby lectures for 1937 delivered at the University of Birmingham.

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primary infection that produces allergy in the lung parenchyma, and a reinfection of the lung with tubercle bacilli. The condition is, therefore, often called the reinfection type. Reinfection was formerly thought to be endogenous in origin, from some previous focus in the body. More recently, however, it is the exogenous inhalation of new tubercle bacilli that is thought to initiate the disease, and this superinfection is considered to be very dangerous because of the possible subsequent development of pulmonary tuberculosis. The logical consequence of this opinion has been that, in certain quarters, emphasis has been placed on the importance of preventing superinfections in the prophylaxis of adult phthisis. In support of this view the well-known fact is often quoted that the disease is sometimes familial; it is supposed that the greater risk of superinfection in such families is directly responsible for the greater incidence.

This supposition is opposed to the existence of a specific antituberculous immunity, which under ordinary circumstances is great enough to protect against new exogenous infections. If tuberculin-positive and tuberculin-negative groups of children are simultaneously exposed to tuberculous infection, it is observed that the inhalation of tubercle bacilli in the former has no deleterious effect, while the latter must pass through the first danger period, mentioned above, during which some of them may die from miliary tuberculosis or tuberculous meningitis. In such a situation there is no doubt as to which group we should like our own children to belong. Those who have safely passed the first danger period are to be regarded as a select group in which the risk of exposure to infection is at a minimum, in marked contrast to the great risk among uninfected children.

Animal experiments have shown that the acquired antituberculous immunity is merely relative; inoculation with relatively large amounts of tubercle bacilli may break down this immunity. It is probable that the same occurs in man. Under ordinary and natural conditions, however, tuberculous infection is seldom if ever a massive one. It is highly probable that only a few virulent bacilli suffice to initiate air-borne lung infection, as Lange (1924, 1932, 1934) and Chaussé (1913–16) have demonstrated. The acquired antituberculous immunity is sufficiently great to protect the organism against such small infections. Air-borne exogenous superinfections, therefore, cannot produce any serious invasion.

The existence of an effective specific immunity against tuberculosis is, however, disputed. Many authors insist on the fact that such immunity is inadequate to prevent progressive disease, with development of new foci and flaring up of old ones. An antituberculous immunity of such a low degree that it permits progressive disease cannot be of any real value. Those who argue in this fashion cannot have grasped the quality of an acquired specific immunity. The specific immunity acquired by a first infection is directed against *new* exogenous infections with the same germ. This holds good for all infections that produce a specific immunity. A syphilitic man, for instance, is immune to a new syphilitic infection, while the already existing illness may progress without resistance. In tuberculosis the acquired immunity protects against exogenous superinfections, but it cannot on the other hand prevent the development of tuberculous disease from existing foci.

CAUSES OF SELECTIVE INFECTION

The question now arises: Why does pulmonary tuberculosis develop only in some of the people infected with tubercle bacilli while the majority escape? It is apparent that the specific antituberculous immunity has nothing to do with the resistance of those who escape pulmonary tuberculosis. The specific immunity of those who have a benign tuberculous infection certainly is not greater than in those who suffer from progressive disease; on the contrary, it is less. The course of clinical tuberculosis must therefore depend on other factors than the acquired specific immunity.

The position of the primary focus exercises no influence on the prognosis. I have already mentioned that probably the lungs are always infected, no matter where the primary focus may be. Cases are reported of primary bovine infection of the tonsils, with subsequent development of bovine pulmonary tuberculosis. It is apparent that this extension to the lungs is brought about by hæmatogenous spread.

Nor can the question be answered satisfactorily by the number of the infecting tubercle bacilli. I have just mentioned that the dosage of bacilli varies probably very little from case to case when the infection is air-borne. Neither has it been possible to prove that the virulence of the bacilli determines whether the infection shall remain encapsulated and latent throughout life, or sooner or later give rise to progressive pulmonary tuberculosis.

If then the course of tuberculosis is not dependent on the specific antituberculous immunity, nor on the quality and localisation of the first infection, the course of the disease must be determined by other factors neither residing in the infection itself nor controlled by it. I am inclined to believe that these factors reside in the organism's natural non-specific resistance. It is owing to their natural resistance that the majority of those infected with tubercle bacilli never acquire pulmonary tuberculosis. Contrariwise, an insufficient natural resistance is the cause of tuberculous deaths in infants and young children.

The degree of natural resistance is determined partly by exogenous and partly by endogenous factors. The influence of poverty, overcrowding, undernourishment, physical and mental strain, &c., cannot be under-estimated. Perhaps the most important of the endogenous factors is the influence of puberty. Pulmonary tuberculosis of the adult type does not exist, practically speaking, before puberty, while afterwards it is very common. It is quite likely that the liability to pulmonary tuberculosis is intimately linked up with endocrine activity. In this way may also the decreased resistance during pregnancy be explained, as well as the increased resistance in old people.

The Familial Factor

Neither external nor internal factors can account satisfactorily for the frequency of consumption in certain families. It is a fact that the standard of living, the risk of exogenous superinfections and other important environmental factors may be comparable in the consumption-ridden and the consumption-free families. In the infected members of the latter pulmonary tuberculosis does not develop. There must exist another factor which influences most members of one family and which is absent in most members of another family. This factor is probably associated with the constitution of the individual, this being, as is well known, often similar in members of the same family.

Consumption was considered a hereditary illness long before it was known to be infectious. When this became evident the frequency of pulmonary tuber-

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culosis in certain families was ascribed to cross-infection. Later when the specific antituberculous immunity was detected, it was also made known that the majority of those in civilised countries are infected with tubercle bacilli before they reach adult age and are thereby rendered immune to cross-infection. The ravages caused by tuberculosis when it was first introduced to primitive races were due to the fact that they had not become previously immunised through tuberculous infection in childhood. Such was the opinion before the late war.

In the course of time, however, it became more and more evident that childhood tuberculous infection was not as general as formerly believed. It was found that more than 50 per cent. of all individuals, even in big cities, acquired their first infection during or after puberty, yet the infection did not generally produce any serious effects. It was apparent that pulmonary tuberculosis in grown-up civilised people could not be due to the absence of a specific antituberculous immunity.

What then would be the explanation for the severe course of tuberculosis among primitive races? And why should it be much more benign among civilised people? This problem is in some quarters thought to be satisfactorily explained in the following manner. A great number of primitive individuals and families have a very low resistance and readily succumb after infection. Those strains among civilised people that possess a similar liability to tuberculosis have already died out in earlier generations. The modern civilised populations correspond to a remnant of the original people; they have a good natural resistance to tuberculosis, and therefore have been able to survive the infection. This interpretation presupposes that the natural antituberculous resistance may be an inherited quality.

It has been known for a long time that heredity plays an important part in determining the course of tuberculosis. The proof of the manner in which this influence operates is not wholly without defects. These consist principally of an under-estimation of certain environmental factors that may be common to several members of the same family. The influence of heredity has been proved in a more reliable manner by the investigations of Diehl and von Verschuer (1933, 1936) on the course of tuberculosis in twins. They found rather clear-cut evidence that hereditary factors play an important rôle on the development and the course of tuberculosis. Thus tuberculosis runs a similar course more often in twins with similar hereditary qualities than in those with different hereditary qualities.

The natural resistance with which an individual is born is not a fixed and unchangeable quality—on the contrary, it is variable in a high degree. A person with a very good inherited resistance may develop pulmonary tuberculosis if exogenous and endogenous factors reduce this resistance. On the other hand, an unfavourable inherited quality may become neutralised by the removal of all the factors that lower resistance. The occurrence of pulmonary tuberculosis may be prevented by a combination of a good natural resistance and absence of unfavourable factors. A combination of a low inherited resistance and other unfavourable factors almost always leads to fatal pulmonary tuberculosis.

Two conditions determine, therefore, whether or not consumption shall result from a childhood infection: (1) the degree of unspecific, natural, and inherited antituberculous resistance; (2) the presence or absence of factors which unfavourably influence the natural antituberculous resistance.

Results of Infection

After this discussion of the probable causes of the development of pulmonary tuberculosis, we return to the vital question of the extent of the risk a tuberculous child runs. The opinion has sometimes been advanced that childhood infection is more dangerously disposed to the development of pulmonary tuberculosis than when the primary infection is contracted at a later date. I can find nothing to confirm this opinion. On the contrary, a childhood infection ought, theoretically speaking, to be the cause of pulmonary tuberculosis more infrequently than a recent primary infection in adult years. The primary focus of a childhood infection, together with its secondary hæmatogenous foci, usually become encapsulated and clinically healed when the infected individual becomes an adult and reaches the danger period of consumption. The foci produced by a primary infection during adult years are usually active and not healed when the danger period of consumption is ushered in. On the other hand, infected children who reach adult age are to a certain degree a select group. They have shown themselves to possess a natural resistance great enough to conquer the primary infection and to prevent development of miliary tuberculosis and tuberculous meningitis. They have already safely passed the first danger period, while the uninfected adults have still to pass through it. Among the latter there may be several with defective natural resistance who as soon as they come into contact with their first infection may acquire severe acute tuberculosis.

Unfortunately, no reliable reports are available at present on the comparative incidence of consumption among those that have acquired their first infection in childhood, and among those primarily infected as adults. In order to be of significance such investigations must especially consider the individual's hereditary and environmental conditions and not only the date at which infection took place. Until we possess better knowledge about these conditions we can only speculate on the degree of risk a childhood infection entails in comparison with a primary infection in adult life.

In Swedish sanatoria I have collected 519 cases of pulmonary tuberculosis of the adult type in which the tuberculous infection made itself manifest with an erythema nodosum. The probable date of the first infection is thus known. Now it turned out that only 81 of these cases acquired their first infection before puberty. It has already been mentioned that the primary infection at the present time occurs with about the same frequency both before and after puberty. The frequency of tuberculous erythema nodosum is, on the other hand, much greater in childhood than among adults. If the figures mentioned above concerning the date of the first infection in adult consumptives have any significance, they certainly do not indicate that the risk of contracting pulmonary tuberculosis of the adult type is considerably greater if the primary infection is acquired in childhood than in later years.

Summary

Children who have contracted tuberculous infection have to pass through two essentially different periods of danger. The first period begins when the primary infection manifests itself and lasts about 3 months. Infants and small children especially are threatened by miliary tuberculosis and tuberculous meningitis during this period. When an infected child has safely passed this first danger period it enters into a

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rather harmless one which lasts until the beginning of puberty. Then begins the second danger period which lasts 2–3 decades and during which those who are infected may become prey to pulmonary tuberculosis of adult type.

The primary infection delivers the first prerequisites for pulmonary tuberculosis of adult type. It produces the necessary change in the mode of reaction of the lung tissue and it delivers the necessary infection of the lung either in form of the primary focus or in shape of secondary hæmatogenous foci or deposits of tubercle bacilli.

The mentioned two prerequisites are present in all infected people. Whether pulmonary tuberculosis of adult type shall arise from the existing lung infection or not depends on the degree of unspecific natural resistance and on the presence or absence of environmental and certain endogenous factors able to influence this natural resistance in a positive or negative way.

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THE GASTRIC LESION IN PERNICIOUS ANÆMIA

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(WITH ILLUSTRATIVE PLATE)

Fenwick, in 1880, was the first in this country to describe atrophy of the gastric mucosa in pernicious anæmia. He recorded 4 cases of "essential anæmia" in all of which there was atrophy of the stomach and especially of the gastric mucosa. Nothnagel, almost at the same time (1879), described similar findings, but in all these cases the stomachs were unfixed and the histology uncertain. In 1900, however, Faber and Bloch published the first of their papers in which they described their findings in material fixed soon after death. They examined the stomachs from 8 patients dying from pernicious anæmia and found a "diffuse gastritis" in every case. Their findings have been generally accepted and have been supported by other workers.

Wallgren (1923–25) examined the gastro-intestinal tracts of 16 cases of pernicious anæmia and 2 cases of aplastic anæmia. He found a diffuse atrophy of the gastric mucosa in all the cases of pernicious anæmia but the stomach was normal in the 2 cases of aplastic anæmia. More recently Brown (1934) has analysed the autopsy records of 42 cases of pernicious anæmia. He states that "the picture of chronic gastritis was present in all but one case" and stresses the absence of acidophil cells in all but 5 cases; but his material was presumably unfixed. Jones, Benedict, and Hampton (1935) record the gastroscopic, surgical, and radiological examination of 5 typical cases of pernicious anæmia which were observed over a long period. They present evidence which, they believe, indicates that atrophy of the stomach occurs particularly during a relapse and not as an invariable accompaniment of the disease. They observed hypertrophic gastritis during a relapse and also during the early stages of a remission, but after specific treatment of the anæmia atrophy and hypertrophy of the gastric mucosa both tended to disappear.

The recent work of Meulengracht (1935) has shown that, in the pig, the intrinsic factor of Castle is produced in the pyloric region of the stomach and in the first part of the duodenum. It has been assumed that this is also true of man and that there is, in pernicious anæmia, a diffuse atrophic lesion of the stomach probably also involving the duodenum. It has been supposed that this would account for the absence of the intrinsic factor in the gastric juice of pernicious anæmia patients.

AUTHORS' OBSERVATIONS

During the past two years we have been able to examine the stomachs, fixed soon after death, from 7 cases of pernicious anæmia. The mode of fixation and the histological technique employed have been similar to those already described by one of us (Magnus 1937). The essential point in the technique was the examination of large areas of mucosa by rolling up long strips of the stomach into "Swiss rolls" and cutting sections of the whole roll.

Of our 7 cases 1 had subacute combined degeneration of the cord which was presumably the cause of death. In the other cases death was due to abandonment of treatment by the patient, or to intercurrent disease.

Our findings in these cases have been unexpected and of sufficient importance to warrant publication without waiting for further material to accumulate.

Macroscopic appearances.—The naked-eye changes observed have been identical in all cases. The upper two-thirds of the stomach—that is, the region of the body mucosa—has shown a severe atrophy so that this area is reduced to the thinness of parchment. At the junction of the body with the pyloric mucosa, however, there is a transition, usually abrupt, to the normal thickness of the stomach wall and this is maintained throughout the whole of the pyloric antrum and duodenum. The mucosal surface in the upper atrophic region is flattened and areæ gastricæ can no longer be seen whilst in the pyloric region the mucosal surface is normal.

These macroscopic appearances are so striking and characteristic that it is possible to recognise the stomach from a case of pernicious anæmia by naked-eye examination alone.

Microscopic appearances.—Histological examination confirms the naked-eye distribution of the atrophy. In the body mucosal region there is a severe atrophy involving all the coats of the stomach wall (Figs. I and II on Plate) and it is clear that the parchment-like thinness observed macroscopically is not due to mucosal atrophy alone.

In the mucosa (Figs. III and IV) all that remains is the surface epithelium and a few scattered glands lined by mucus-producing cells, whilst the specialised oxyntic and peptic cells have entirely disappeared. Yet, in spite of this, there is a complete absence of

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fibrosis, cellular infiltration, obliterative endarteritis, or other evidence of past inflammation and there is a corresponding absence of fibrosis in the submucosa and subserosa. The muscle coat shows atrophy, but here also there is an absence of fibrosis.

In several of the stomachs large areas of intestinal epithelium were present in the atrophic body mucosa, but not in the normal pyloric mucosa. It has been shown elsewhere (Magnus 1937) that intestinal epithelium occurring in the stomach has all the characteristics of true intestinal epithelium and is to be regarded as an example of metaplasia.

In all 7 stomachs there was no suggestion of atrophy or of an inflammatory lesion in the pyloric or duodenal mucosæ (Figs. V and VI) and Brunner's glands also showed no abnormality.

DISCUSSION

In all the 7 cases of pernicious anæmia examined the stomachs have shown a profound atrophy involving all the coats of the stomach wall and localised in its distribution to the body mucosa region. The pyloric antrum and duodenum, where it has been assumed that the intrinsic factor of Castle is produced, have shown no pathological abnormality. There is, therefore, a morbid anatomical basis for the achylia gastrica present in pernicious anæmia but not for the absence of the intrinsic factor if we assume that it is produced in the regions already stated. It is conceivable, however, that a lesion may be present in the pyloro-duodenal region somewhat similar to that found in the cells of the islets of Langerhans in diabetes, but that it has not yet been possible to demonstrate any such lesion by the histological methods so far employed.

Shortly after we had examined our fourth case Meulengracht (1937), at the first meeting of the German Hæmatological Society held at Münster in May of last year, described similar results in several cases, a finding which was completely the reverse of what he had expected from his animal observations. He stated, however, that he was proposing to estimate the total amount of pyloric and Brunnerian glandular tissue present and compare the result with normal controls.

It has been generally assumed that the gastric lesion present in pernicious anæmia is the end-result of an inflammatory gastritis, but an examination of our material shows that this is not so. None of the criteria of a chronic inflammatory process are present and a lesion similar to the one present in pernicious anæmia stomachs has not been found in association with simple or malignant ulceration. We have had the opportunity of examining the stomachs, fixed soon after death, from 2 cases of severe anæmia not pernicious in type (one aleukæmic leukæmia, the other orthochromic anæmia of pregnancy) and in both of these the stomachs were normal. In addition, no lesion resembling that present in the pernicious anæmia stomachs has been found in over 50 stomachs from unselected cases fixed soon after death. Unfortunately we have not been able to obtain any material from patients dying with an achlorhydric anæmia.

From the evidence available it appears that the gastric lesion present in pernicious anæmia is almost certainly not the end-result of an inflammatory gastritis, but is to be regarded as an atrophic process, the cause of which is not yet known, but which may be the end-result of some endocrine or nutritional deficiency or may even be congenital in origin. From its nature it is unlikely that regeneration to normal gastric mucosa ever occurs.

SUMMARY

1. The stomachs from 7 cases of pernicious anæmia have been examined. These were fixed as soon as possible after death.

2. In all cases a characteristic lesion has been found localised in its distribution to the region of the body mucosa and not affecting the pyloro-duodenal region.

3. This lesion affects all the coats of the stomach wall and from its histological appearances is almost certainly not the end-result of an inflammatory process.

4. The possible bearing of these findings on the problem of the site of formation of the intrinsic factor in pernicious anæmia is discussed.

One of us (H. A. M.) has carried out this investigation, as part of a research into the pathology of gastritis, with the aid of a grant from the cancer department of St. Bartholomew's Hospital.

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ALCOHOLIC LABYRINTHINE INJECTION

THROUGH THE OVAL WINDOW IN THE TREATMENT OF AURAL VERTIGO

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(WITH ILLUSTRATIONS ON PLATE)

THE work upon which this paper is based has been carried out in the first place upon the cadaver and more recently upon the living subject. Its object has been to determine the detailed destination of alcohol when injected into the labyrinth through the oval window, to what extent such an injection affects the cochlea and/or semicircular canals, what is the optimum quantity of alcohol to inject, and finally, to devise a technique by which this procedure could be applied with safety to the living subject.

Some years ago Sydney Scott showed that by alcoholic injection the function of the labyrinth could be destroyed in pigeons. Since that time Mollison (1931, 1934–36) has published a series of 30 cases of aural vertigo upon whom a preliminary mastoid operation was performed and alcohol introduced into the labyrinth through the exposed external semicircular canal. Of these cases 73 per cent. were cured of their vertigo. Mill (1936) has published a similar series of 7 cases treated in the same way with good results. Wright showed a patient in 1934 in whom the labyrinth had been injected with alcohol through the oval window. This patient was completely cured of her labyrinthine symptoms but a severe otitis media and facial paralysis occurred. He has kindly allowed me to mention that this paralysis is still present, though the suppurative condition subsided after some months and the ear has been dry since that time. He expressed the hope when the case was shown that by the injection of smaller quantities of alcohol these complications could be avoided.

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Many cases, it may be said the majority (Wright 1937), of aural vertigo respond and are relieved of symptoms by the removal of focal sepsis. It is not the object of this paper to discuss the selection of cases, but rather to consider the limited number that do not respond to this and other forms of treatment, and in which destruction of labyrinthine function appears to be the only step by which relief from symptoms can be obtained.

The advantage of injection through the oval window as opposed to other routes is that no preliminary mastoid operation is necessary, the surgical procedure to which the patient is subjected being the comparatively minor one of passing an injection needle through the drum and oval window into the labyrinthine vestibule.

It has been with the object, in addition to those already stated, of determining whether and by what means the known complications of facial palsy and the otitis media can be avoided that this work has been carried out. It is believed that these objects have been attained and two cases have been successfully treated, but the conclusions reached, in so far as they are conclusions, must be regarded as no more than preliminary in that only two clinical cases are under review.

EXPERIMENTS ON CADAVERS

The method of investigation carried out upon the cadaver has been to remove in toto that portion of the skull containing the labyrinth, middle ear, and external bony auditory meatus. The anterior meatal wall, together with the drum, malleus, and incus, has then been dissected away, thus leaving a mobile labyrinthine unit that can be injected and investigated at will. In all cases the injection has been made through the oval window and foot-plate of the stapes, since this is the most direct method of approach to the labyrinth in the living subject. The situation and angle at which the round window is set prevents the possibility of this method of approach which, even were this not so, would still be less suitable owing to the greater distance through which alcohol would have to travel before reaching the semicircular canals.

The first factor that became apparent upon making such an injection was not unexpected. The labyrinth, from a mechanical point of view, is a cavity filled with fluid and surrounded by bony walls. Any injection of fluid into it, therefore, can only be made at the expense of an equal quantity of fluid, which is simultaneously displaced, returning along the side of the injecting needle into the middle-ear cavity, and consisting of the injected alcohol diluted only to a slight extent by the original labyrinthine contents.

It seems a matter of the first importance to prevent this displacement of fluid into the middle ear, as otherwise the extent to which the alcohol reaches the whole or part of the labyrinthine structures must remain an uncertain and variable factor in different cases. In the second place the return of alcohol into the middle-ear cavity would inevitably give rise to an otitis media and possibly to some sloughing of mucous membrane. It is evident also that facial nerve palsy may be brought about by this means, since the thin bony walls of the canal in which the nerve lies appear to be an inadequate protection against adjacent alcohol.

The principle therefore of applying balanced and simultaneous suction at the time of making the injection was devised. A needle with a double lumen is used which is passed through the drum, middle ear, and oval window into the labyrinthine vestibule. By this means the middle ear can be isolated and, so long as the rate of injection and strength of suction remain constant and balanced, a circulation, rather than an injection, of alcohol can be established in the labyrinth without any overflow of fluid into the middle ear. An additional advantage is that the possibility of injecting too large a quantity of alcohol need not be feared.

Working upon these lines two series of cadaverous labyrinths were injected with a saturated solution of sodium iodide, and the extent to which a total injection of the labyrinth had been made investigated by subsequent X ray. In one series simple injections without suction were made, fluid being allowed to regurgitate into the middle ear. In the second series balanced injection and suction was used, and regurgitation thus prevented. The following findings were obtained :—

Without suction (with regurgitation).—(1) If injection was stopped as soon as there was regurgitation of fluid into the middle ear, an inadequate injection of the semicircular canals was obtained (Fig. I on Plate). It may therefore be said that unless suction is used it is not possible to obtain an anatomically complete labyrinthine injection without the middle ear being flooded with regurgitant alcohol.

(2) With less than ½ c.cm. the semicircular canals are irregularly and incompletely filled (Fig. II).

(3) The smallest quantity with which there was full filling of the canals in some instances was found to be ½ c.cm. (Fig. III), but results were inconsistent, as can be seen from Fig. IV, where 3 c.cm. was injected, and part of the superior canal is still unfilled.

With balanced suction (regurgitation prevented).—Fig. V is the picture uniformly obtained by this method. It will be seen that all the canals are well and uniformly filled. Comparison of Figs. IV and V well demonstrates a further point that is thought to be of importance—when suction is used, the vestibule is left empty. In view of the close proximity of the VIIth nerve canal to the vestibule, this may prove to be a matter of moment, and will be referred to again later.

It will be noticed that in none of the foregoing Figures has the injected fluid passed into the cochlea. This fact was found to depend upon one anatomical and two other factors. Fluid injected into the vestibule can pass readily into the semicircular canals because these communicate with the vestibule at their two ends, and there is therefore no mechanical obstruction to fluid circulating through them, returning to the vestibule, and being then carried away through the suction needle. The cochlea on the other hand is, mechanically, a long tube connected with the vestibule at one end only, the other terminating blindly at the foramen rotundum. Fluid therein circulates therefore much less readily, and under no circumstances could the cochlea be filled with a saturated solution of sodium iodide, the considerable viscosity of this solution preventing its satisfactory entry.

A further series of injections, with suction, was therefore performed, using an alcoholic solution of carbolfuchsin as the injected fluid. The bones were subsequently dissected and the cochlea and canals examined for staining with the dye. By this means it was found that both the semicircular canals and cochlea can be satisfactorily filled with alcohol if 3 c.cm. of alcohol is circulated with balanced suction, a lesser quantity resulting in partial cochlear filling only. By the use, with suction, of no more than ½ c.cm. of alcohol it was found that the semicircular canals were well filled and the cochlea was unaffected. This latter fact, in that the canals might be destroyed for vertigo and some degree of hearing retained, is

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thought to be of theoretical value only. In the first place, the majority of these patients suffer from tinnitus in addition to vertigo; secondly tinnitus, if absent, might be induced by such an injection; and lastly, the injection would in itself in all probability deprive the patient of useful hearing in spite of the absence of cochlea filling.

In order more fully to investigate the possible routes by which injected alcohol could reach and damage the facial nerve, a series of labyrinths were injected with alcoholic carbolfuchsin and dissection of the bones deferred for 24 hours. A control series were dissected immediately after injection. In none of the control series was the facial nerve stained by the dye, but in the deferred series some staining of the nerve was present in 60 per cent. of instances, alcohol having passed through the bony walls of the vestibule into the adjacent VIIth nerve canal. It is for this reason that, as previously stated, a vestibule emptied of alcohol at the end of injection is thought to be desirable. It is realised that this finding is not entirely comparable with what might be found in the living subject, but it is thought to be significant enough to call for an attempt at preventing its possible occurrence. This has been done by duplicating the injecting apparatus, so that the injection of alcohol can be followed after an interval by a similar injection of saline through the same needle, without removing it from the vestibule. By this means the alcohol is washed out of the labyrinth and the latter irrigated with saline, thus avoiding any alcohol remaining in the vestibule after the injection is finished.

From the evidence as so far stated one is apparently justified in claiming that the labyrinth can be fully injected with alcohol through the oval window, while the risk of facial nerve involvement is reduced to a minimum. It is hoped that this risk will prove to be non-existent, but this can only be established by the treatment and observation of a larger number of cases.

TREATMENT OF THE LIVING SUBJECT

Apparatus has been devised in which gravity is used as the force for giving the injection (this is obtainable from the Medical Supply Association Ltd., London, W.C.). In this way a constant rate and strength is obtained. The time taken by this apparatus to inject 3 c.cm. of alcohol is 9 sec., the outside bore of the injecting component of the needle (made by Mayer and Phelps Ltd., London, W.) being No. 23 standard wire gauge. It has been found desirable to use a slightly larger bore for the suction component, the outside bore here being No. 21, and the degree of suction needed to balance this rate of injection is 15 in. of mercury. An initial injection of a few drops of 1/1000 adrenaline through the drum into the middle ear is of assistance in assuring a bloodless field. The characteristic sensation transmitted to the operator's hand when the needle pierces the foot-plate of the stapes is identical on the cadaver and in the living subject.

CASE 1.—A woman aged 48 with attacks of vertigo of varying degree, and occurring up to five and six times a day for 18 months. Frequency and severity of attacks had increased during the last 3 months. She fell at times, was nauseated but did not vomit. Increasing deafness left ear for similar period; severe tinnitus left ear for 2 yrs.; drums normal; deafness was of the nerve type with reduced bone conduction and greater loss of high than of low tones. Nose and nasal sinuses normal. Eustachian tubes clear. Wassermann negative. Blood count normal. Central nervous system normal. No focal sepsis.

Operation.—3 c.cm. alcohol circulated through left labyrinth under general anæsthesia. Left eye deviated fully to right at start of injection and almost immediately returned to central position; no further movement. Alcohol left in situ 10 min. after which 3 c.cm. normal saline was circulated through labyrinth and needle withdrawn. There was intense giddiness with coarse nystagmus to the right upon her regaining consciousness, this being due to an overaction of the unopposed and normal right labyrinth. This persisted for three days and improved thereafter daily. Patient started to walk after 14 days and left hospital after six weeks, walking steadily. No vertigo, other than the compensatory vertigo of the first 10 days, has been experienced since the injection. The needle perforation has healed and the drum has returned to normal. Labyrinthine function is found to be totally destroyed.*

CASE 2.—A girl aged 19 had right otorrhœa 12 years ago. None since. Severe attacks of vertigo on an average of every six days for the last 4 yrs. She vomited, but never fell. Deafness of the nerve type; no tinnitus; apart from a small posterior scar the drum was perfectly normal; no active sepsis. Blood count normal. Wassermann negative. Eustachian tubes clear. Central nervous system normal. No focal sepsis.

Operation.—3 c.cm. alcohol circulated through right labyrinth and irrigated with saline as in previous case. Alcohol left in situ for 3½ min. only. Period of compensatory vertigo as in Case 1, but she made more rapid recovery and was walking well on the eleventh day. The perforation has healed and the drum has returned to normal. Labyrinthine function on examination is found to be totally destroyed. No vertigo, other than that during the compensatory period, has been experienced since injection.

Both cases were closely observed and at no time was there any suggestion of facial weakness. In Case 2 a large blood clot collected overlying the perforation in the drum, which it was thought best to leave undisturbed. Fluid, however, collected beneath the drum and this was evacuated, the ear discharging thereafter for 4 days. It is hoped that this complication can be avoided in future. No tinnitus was present in Case 2 before or after injection, but in Case 1 it is of interest to note that the tinnitus was unaffected in spite of cochlea destruction. The symptom in this case had been present for two years and had, it must be assumed, become centralised in the central nervous system. Analogous cases have been reported of persistence of tinnitus after homolateral section of the VIIIth nerve. Examination of a larger number of cases might prove illuminating in ascertaining the length of time that tinnitus can be present without centralisation.

SUMMARY

1. An investigation into the effects of alcoholic labyrinthine injection through the oval window has been carried out upon the cadaver.

2. The procedure results in total destruction of labyrinthine function.

3. The incidence of the known possible complications of facial palsy and otitis media is thought to have been reduced to a minimum.

4. Two women treated in this way were entirely relieved of aural vertigo.

I wish to acknowledge my indebtedness to Dr. A. Robinson Thomas for his assistance in the radiography.

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* This patient, after five months' freedom, has recently reported some return of giddiness. Opportunity for adequate observation is required before further comment is made.

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ARTERITIS OF THE TEMPORAL VESSELS

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(WITH ILLUSTRATION ON PLATE)

In America attention has been drawn in recent years to arteritis of the temporal vessels. Horton and Magath (1934, 1937), and Macdonald and Moser (1937) have between them observed 8 cases of arteritis of these vessels, and apart from one exception only the temporal arteries have been involved. The symptoms and the course of the illness have in all cases been very similar and the disease has affected persons in the same age-group. Horton and Magath (1937) in a recent account give a full summary of the nature of the symptoms. "A non-fatal disease which is characterised by periarteritis and arteritis of the temporal vessels with painful areas over the scalp, and which is accompanied by headache, general malaise, lassitude, weakness, night sweats, anorexia, loss of weight, anæmia, and mild leucocytosis." Pain in the jaw on opening the mouth, and earache are other possible symptoms. The course of the condition as seen by these writers is in all cases towards recovery, and its duration 2–6 months, though temporary relapses were noted. The incidence of the condition is almost invariably in persons of over 60.

Horton, Magath, and Brown (1934) consider that there is in this condition "a new clinical syndrome" and they describe it as a previously undescribed form. They attempt a clinical and pathological differentiation between the temporal arteritis in their cases, and other forms of arteritis that have been described as pathological entities, such as polyarteritis nodosa, thrombo-angiitis obliterans, rheumatic arteritis, and other forms associated with recognised infections. The Wassermann reaction has always been negative in their cases, and indeed no cause has yet been found.

There is great difficulty in making a confident separation of some of the forms of arteritis into groups on account of the lack of knowledge about the causation. The causative factor has yet to be found in thrombo-angiitis obliterans, in polyarteritis nodosa, in the rheumatic states, and in these cases of temporal arteritis. These groups therefore are separated on clinical and histological grounds, and a comparison is given in the Table. This embodies the findings of Pappenheimer and von Glahn (1926) in rheumatic arteritis, and in the other forms evidence is included from Boyd (1935), Ophüls (1923), and from authorities quoted elsewhere in this paper. In the Table the differences between the various forms have been stressed, yet there is evident wide overlapping of the clinical and pathological findings in the four groups of arteritis.

CASE REPORTS

Two cases of temporal arteritis have been observed by us and, as in the American cases, these were in old people who developed signs of a prolonged, febrile, debilitating illness of unknown ætiology. Severe headache was a feature of the illness in both cases. The temporal arteries stood out as tender pink cords and there were nodules on them and on the neighbouring scalp. Pulsation gradually disappeared from the distal parts of the affected arteries subsequent to the appearance of the inflammation. In the first case, thrombosis also occurred in both retinal arteries, causing a great and persistent visual impairment; and much narrowing of the arteries of the right foot and of the left brachial artery also was present. This patient had a palpable liver and twice had diarrhœa, findings of doubtful significance. The second patient died at the age of 74, two years after the illness. She showed no visceral symptoms. With the exception of visual impairment and diminished circulation in the right foot and left arm in the first patient, the condition cleared up, at any rate temporarily, in both cases.

FIRST CASE

A housewife, aged 66, had complained of pains in the limbs for eight months and of headaches for a month; sight had been lost in the left eye for a week. She had had no illness of note apart from scarlet fever in childhood. She had had seven miscarriages and had lost five children in infancy. Her present illness dated back to May, 1936, nine months before her admission to Hammersmith Hospital. She was at first merely troubled by extreme fatigue, but in June she had pains in the thighs and knees, which later spread to the ankles; by July, these were so severe that she was confined to bed. She was feverish and often sweated at night during the next two months. In August she had pains in all four limbs. By October she was much better, but the pains were still noticeable in the limbs when she moved. In November she was able to get up, but she had lost much weight and felt very weak. She went out, though unable to walk, in December and remained fairly well until the end of the month when she became stiff in the neck. Early in January, 1937, she began to get headache all over her head. The mouth became stiff, and her ears "felt swollen in the lobes." The back of her head was tender and she was able to feel tender little swellings on her forehead. Her mouth was painful to open and the headaches became so severe that she "thought they would drive her mad." On Feb. 2nd a spot appeared in front of the left eye and during the next five days "it was as though a curtain was being drawn down over the left eye, removing all sight from it." A haziness began to develop in the right eye just before her admission on Feb. 8th.

On admission.—A thin, pale, ill-looking old lady suffering from pronounced photophobia. Pulse-rate 100, temperature normal. Pyorrhœa around the lower incisors. There was slight thickening of the radial arteries; blood pressure 160/80 mm. Hg. Heart normal; lungs emphysematous. Liver just felt but not tender; no other abnormal abdominal signs. There was considerable muscular wasting. The shoulders and knees were stiff and painful, and slightly crepitant when moved. Extension of the elbows was painful and somewhat limited. The metacarpophalangeal joints were slightly swollen, but there was no swelling of any other joints.

LEGENDS TO ILLUSTRATIVE PLATE

(*See opposite page*)

DRS. MAGNUS and UNGLEY: *The Gastric Lesion in Pernicious Anæmia*

I.—The thickness of the stomach wall in the body mucosal region of a normal stomach. (× 9.)

II.—The thickness of the stomach wall in the body mucosal region of a pernicious anæmia stomach. (× 9.)

III.—Normal body mucosa. (× 102.)

IV.—The body mucosa in a pernicious anæmia stomach. (× 138.)

V.—The thickness of the stomach wall in the pyloric region of a pernicious anæmia stomach. (× 15.)

VI.—Duodenal mucosa and Brunner's glands in a pernicious anæmia stomach. (× 96.)

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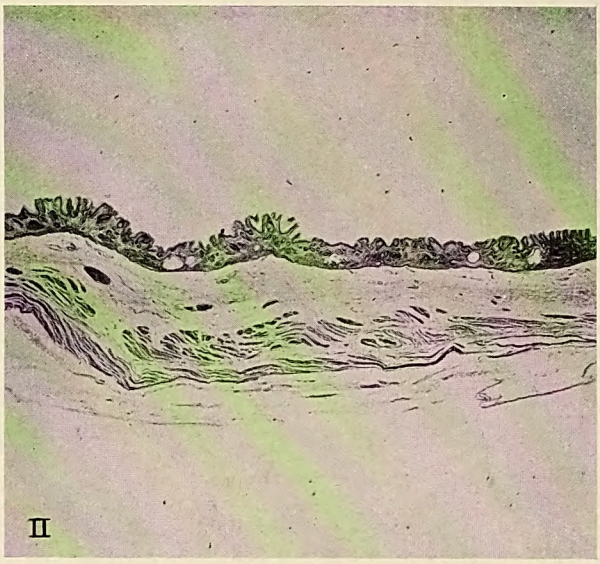
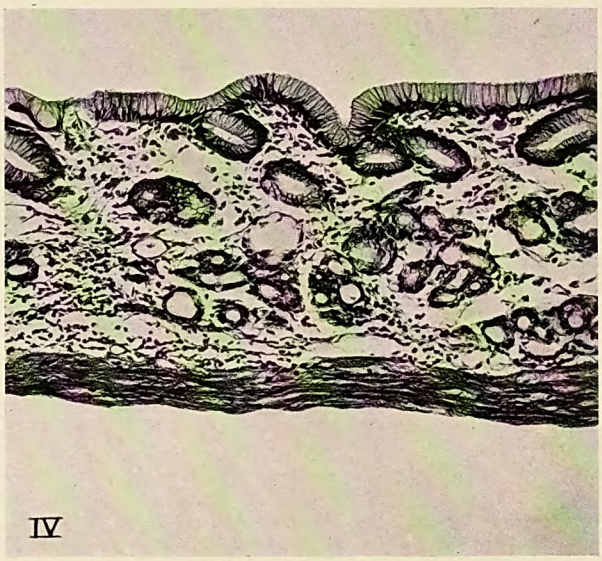
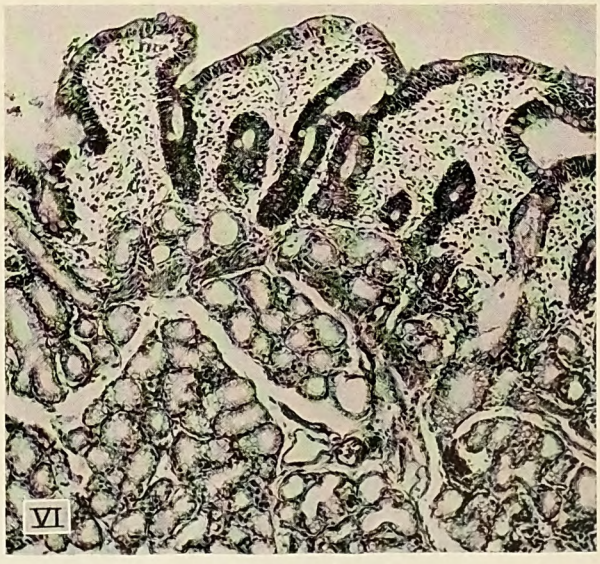
DRS. MAGNUS AND UNGLEY: THE GASTRIC LESION IN PERNICIOUS ANÆMIA







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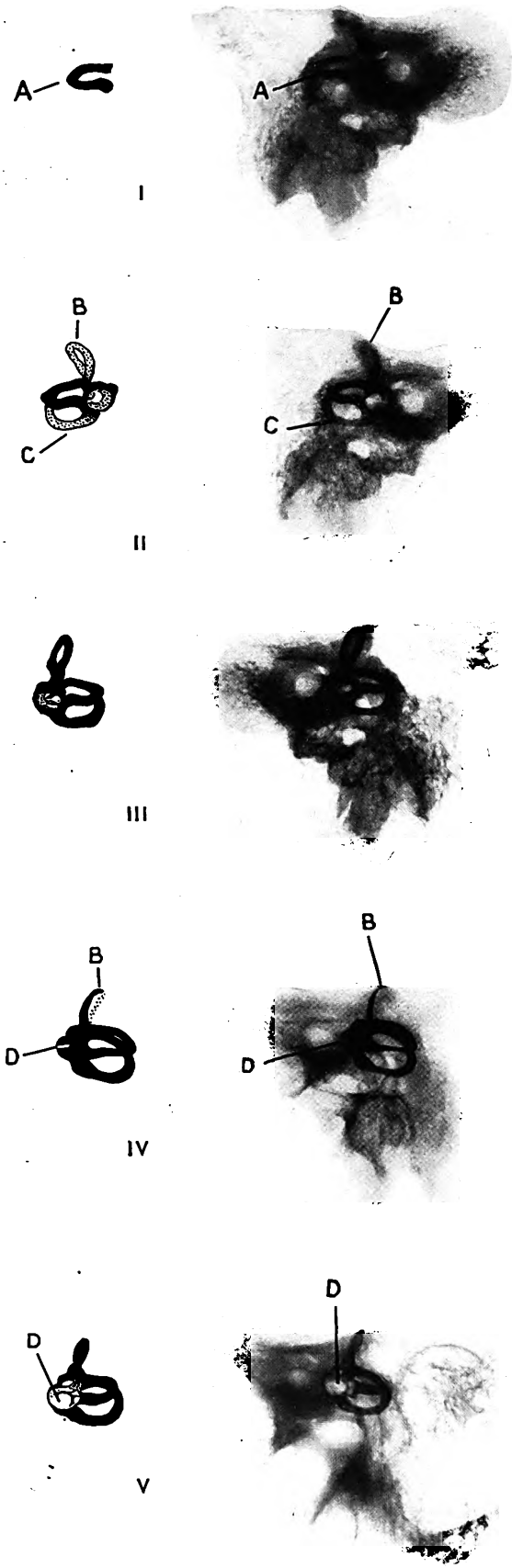
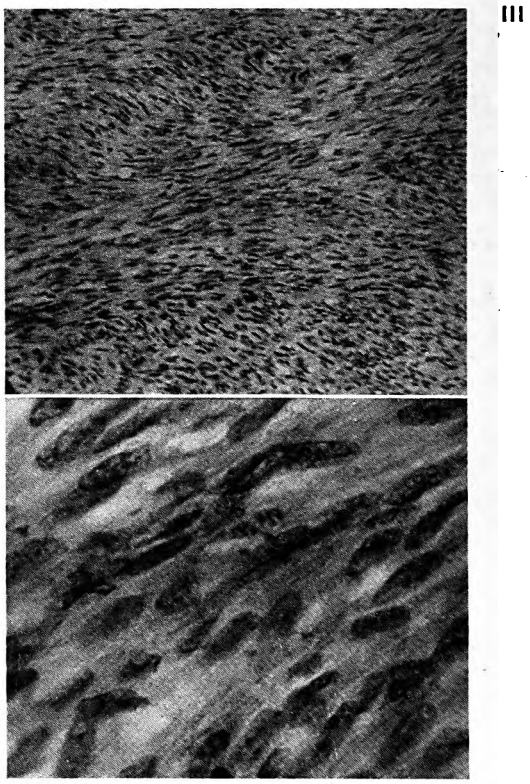
MR. PEACOCK : LABYRINTHINE INJECTION FOR AURAL VERTIGO



MR. SWORN & DR. COOPER : LEIOMYOMA OF THE STOMACH



DR. JENNINGS : TEMPORAL ARTERITIS

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Examination of head.—The left eye was completely blind and vision in the right eye was slightly impaired. The left pupil was large and failed to react to light. In the left fundus oculi the disc was pale with a small central hæmorrhage, and the retinal arteries were narrow. Mr. R. C. Davenport reported on Feb. 11th a definite obstruction of the central artery of the left retina. At this time lateral eye movements caused pain in the left eye. In the right eye there were at first no obvious ophthalmoscopic signs. On admission the anterior branches of both temporal arteries were thickened and tender, the thickening is thick, with many fibroblasts and some mononuclear cells. The media is also fibrosed and its muscular and elastic elements are disorganised and largely destroyed. It also shows some cells of imperfect multinucleated giant cell form. The adventitia is fibrosed. In addition the *active* process is signalised by the presence of numerous polymorphs. The histology does not enable one to name the infective agent. It is not unlike that described in rheumatic arteritis, but this description is applied to vessels of internal organs. Polyarteritis nodosa is *not* excluded by the appearances."

Progress.—The subsequent general progress of the patient was slow and liable to brief set-backs, but at the end of three months she was able to get up. Her knees were stiff, and even in the fourth and fifth months when she walked her gait was very uncertain. Her weight was always low (7 st.) and showed small fluctuations. There was practically no fever except immediately after dental extractions, and the pulse-rate settled to 80–90. The sedimentation-rate remained raised, but was lowest in April when the weight was highest. Apart from two short bouts of diarrhœa, there were no visceral manifestations. The arteries showed no further change after the inflammation had subsided, but pulsation became perceptible in the right temporal artery for about an inch above the outer canthus. The arterial pulses in the right foot remained almost imperceptible, and an inequality in the brachial pulse was noted during the sixth month. Blood pressure in the right arm at this time was 155/80, and in the left arm 120/80 mm. Hg.

When seen in December four months after discharge from hospital her general condition was excellent and she had gained nearly a stone in weight. The pulse changes were much as before, the left radial being very hard to feel. Blood pressure in right arm was 165/100, in the left 130/95. The temporal and retinal arteries were unchanged.

Further investigations.—Blood counts:—

February.		April, and subsequently.	
Red cells ..	.. 5,200,000	Red cells ..	.. 4,800,000
Hæmoglobin	.. 84%	Hæmoglobin	.. 78%
Colour-index	.. 0·81	Colour-index	.. 0·8
Leucocytes	.. 13,000	Leucocytes	.. 10,000

Normal differential throughout.

Wassermann reaction negative. Sedimentation-rate (Westergren): 108 mm. in the first hour in February, 18 mm. at the end of March, 68 mm. in June, and 48 mm. in August. Urine: Specific gravity 1008–1030 on admission; a few leucocytes and red blood-cells, and an infection with *Bacillus coli*. In July some hyaline and granular casts also were present. Radiography: Lungs emphysematous, left ventricle very slightly enlarged; left wrist showed general bone decalcification with small oval translucent areas in distal ends of radius and ulna; the articular surfaces of the wrist-joint were intact. Sinuses were all normally translucent.

LEGENDS TO ILLUSTRATIVE PLATE

(*See opposite page*)

MR. PEACOCK: *Alcoholic Labyrinthine Injection through the Oval Window in the Treatment of Aural Vertigo*

I.—No suction. Injection stopped immediately regurgitation occurred. (A) External canal partly filled. Others empty.

II.—No suction. ½ c.cm. injected. (B) Superior, and (C) posterior canal, both poorly filled.

III.—No suction. ½ c.cm. injected. Canals well filled.

IV.—No suction. 3 c.cm. injected. (B) Superior canal only partly filled. (D) Vestibule full.

V.—With balanced suction. All canals well filled. (D) Vestibule empty.

MR. SWORN & DR. COOPER: *Leiomyoma of the Stomach*

FIG. III.—Sections of tumour, showing plain muscle. Above, × 175. Below, × 900.

DR. JENNINGS: *Temporal Arteritis*

FIG. I (CASE 1).—Longitudinal section of wall of temporal artery (× 100). (Verhoeff-van Gieson.) Shows thickened cellular, and fibrotic intima (A) with ruptured internal elastic lamina (dark stain); disorganisation and fibrosis of media with leucocyte and giant-cell invasion (B); and fibrosis of adventitia (C).

being greater on the left side. The scalp was very tender in both frontal and occipital regions. On the right side there were a few small, shotty, tender nodules on the forehead near the termination of the anterior temporal artery. During the next few days both anterior temporal branches became pink, and were more tender and thickened in their course on the forehead. Pulsation diminished and became impalpable in these arterial segments during the first ten days in hospital. At the same time vision in the right eye rapidly deteriorated, and by Feb. 17th the right disc had become pale and there was a small hæmorrhage below and near the disc. There was practically no vision in the lower half of the field, and on Feb. 25th Mr. Davenport reported a progressive obliteration of the right central retinal artery with especial narrowing of its upper branches. From about this time the inflammation began to subside, and in the following month the swollen temporal arteries became less prominent and tender, finally becoming almost impalpable. The retinal hæmorrhages absorbed and the headache, eye pains, and photophobia were lost. At the same time the patient felt that she could see more clearly, although there was no increase in the visual fields. She was able to read large print with the right eye.

Histology.—On March 10th, during the period of subsidence of the inflammation, a small section of the proximal part of the right anterior temporal artery was removed by Mr. A. J. Watson for histological examination (Fig. I on Plate). Dr. John Gray's report was as follows: "Chronic and active arteritis. The *chronic* change affects all coats producing an extensive vascularisation and fibrosis. The intima

SECOND CASE

An unmarried woman aged 72 complained of headaches and not feeling up to the mark. She had had no serious illnesses; good health until the end of 1930. At the beginning of 1931 she began to feel weak and out of sorts. Her appetite became bad and her food seemed dull and tasteless. She then began to complain of a dull headache in the right temporal region, and at night had sharp shooting pains over the right temple. This headache persisted for some weeks and then gradually improved. While she had the headache there was tenderness on pressure over the temporal region. After a few weeks the same symptoms developed on the left side and were more severe. After the headaches came on she thought she had been running a temperature. Apart from these she had no other symptoms. Her bowels were regular; she had no trouble with her urine; she had not lost weight. She had never been liable to colds and as far as she knew had never

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had sinus trouble. There was no history of injury to the head. All her teeth had been removed some years before.

On admission.—A woman who looked ill. There was considerable arterio-sclerosis. The heart was not clinically enlarged and showed no abnormality. Chest slightly emphysematous, but not bronchitic. Blood pressure 160/90 mm. Hg. Radial and brachial arteries thickened and tortuous; retinal arteries only slightly tortuous. Spleen and liver not palpable; abdomen normal. The central nervous system was also normal.

Examination of head.—The temporal arteries on both sides of the skull were irregularly thickened and tortuous, and felt rather nodular. There was definite tenderness on pressure over the lines of the arteries and its branches on the left side; the skin over the line of the arteries was reddened and slightly inflamed. In places the subcutaneous tissues seemed to be adherent to the artery (see Fig. II).

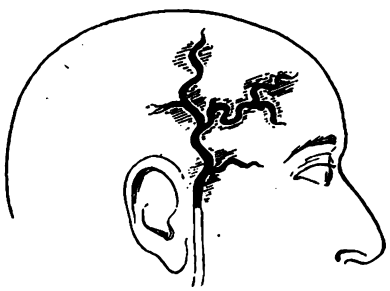

FIG. II.—Diagram showing extent of temporal arteritis in Case 2. The condition was similar on the left side. Over the shaded areas the skin was inflamed and reddened.

Further investigations.—The patient was under Dr. Leslie Cole's care in Addenbrooke's Hospital, Cambridge, for five days. She did not wish to stay in hospital longer and was discharged home. While an inpatient her evening temperatures were 99–100°. Other findings were as follows: Blood culture negative. Blood count:—

Red cells ..	.. 4,500,000	Polymorphs	86%
Hæmoglobin ..	48%	Small lymphocytes ..	9%
Colour-index ..	0·53	Large " ..	3%
Leucocytes ..	9,100	Eosinophils	1%
		Basophils	1%

Radiograms of chest and sinuses normal. Urine: specific gravity 1020; no chemical or microscopic abnormalities, and two catheter specimens were sterile on culture; subsequent to discharge *B. coli* were found in the urine. Electrocardiogram normal, but for a sinus tachycardia of 100–120. Wassermann reaction was not done.

Progress.—After discharge, the general and local conditions improved considerably, but little more is known of this patient apart from the fact that she died about two years after the acute illness.

Dr. Leslie Cole who has kindly supplied me with these details of his case has also made a diagram (Fig. II) which shows the extent of the disease. He remarks that "the diagnosis made then was subacute periarteritis, but the condition was a very strange one."

TREATMENT

Apart from general measures, treatment must obviously be empirical in these cases. In Case 1 potassium iodide and sodium salicylate were used, and iron was given to relieve the anæmia. This patient had early joint changes, and like three of the cases of Horton and Magath, showed definite pyorrhœa; but naturally in old subjects these were not matters for much comment. The oral sepsis was eliminated from Case 1 at the end of her third month in hospital.

DISCUSSION

Horton and Magath have described temporal arteritis as a "new clinical entity," but it is evident that as in at least three other forms of arteritis, a cause must be found before their group of cases can profitably be described as something new. With this knowledge it might be found necessary to modify the usual view of polyarteritis nodosa and to group with it the cases of temporal arteritis; or on the other hand proof might be afforded to those who do not believe that polyarteritis nodosa is itself a disease entity. The section of artery taken from Case 1 showed changes similar to, though rather less acute than, those seen by Horton, Magath, and Brown (1934). This was probably because it was removed in the stage of subsidence, and from a place proximal to the main inflammation. It is significant that Dr. Gray without knowledge of the case-history, found appearances resembling those of rheumatic arteritis and at the same time was unable to exclude polyarteritis nodosa as a possible diagnosis. In this connexion it is important to remember the strong association of rheumatism and polyarteritis nodosa which was demonstrated by Friedberg and Gross (1934). In a small series they found 6 cases of evident polyarteritis nodosa whose hearts showed rheumatic endocarditis and Aschoff bodies in the myocardium. Muscle and joint pains, fever, sweating, and anæmia are findings both in the rheumatic states and in polyarteritis nodosa. Such symptoms were present in our Case 1, in which the joint changes were suggestive of mild rheumatoid arthritis; but in so old a patient they were of little diagnostic value.

Though Gruber (1925) has denied that polyarteritis nodosa is a disease sui generis, others consider that it may be caused by a virus. The association of polyarteritis nodosa and rheumatic manifestations suggests the interesting possibility that some such virus as has been described in rheumatic fever (Schlesinger and others 1935), and also in rheumatoid arthritis (Eagles and others 1937), may be the causative agent in all these similar forms of arteritis. That thrombo-angiitis obliterans also may be caused by an infection is suggested by Allen and Lauderdale (1936) in their account of its supposed transmission from a patient to a surgeon when a spicule of bone penetrated the surgeon's finger during operation. Unfortunately these authors give us no histological proof of their supposition.

In general, polyarteritis nodosa shows acute, widespread, and fatal lesions in vital organs, while thrombo-angiitis obliterans and temporal arteritis are comparatively chronic and localised. But thrombo-angiitis may be widespread and rapidly fatal, with involvement of both visceral and retinal vessels (Birnbaum and others 1934). Retinal vessels may also be inflamed in polyarteritis nodosa (Arkin 1930) and in "temporal arteritis." Our first case showed retinal arteritis, and in the American cases "retinal phlebitis" with hæmorrhages and exudates was described in two cases. These two conditions are similar in that while polyarteritis nodosa may show an inflammation of the temporal arteries, "temporal arteritis" is also a nodular condition and may involve other arteries than the temporals. As well as the involvement of retinal vessels Horton and Magath (1937) report involvement of a branch of a radial artery, and in our first case the changes found in the arteries of the limbs may have been due to the arteritis. In this case the appearance of red blood-cells and hyaline and granular casts in the urine might suggest the possibility of involvement of the renal arterioles. An inflammation of the renal arterioles is a feature of many of the cases of polyarteritis nodosa, and its symptoms may closely mimic those of acute nephritis, as in the case quoted by

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TABLE SHOWING FORMS OF ARTERITIS CONTRASTED

—	Thrombo-angiitis obliterans.	Polyarteritis nodosa.	Rheumatic arteritis.	"Temporal arteritis."
Clinical picture.	Intermittent claudication. Erythromelia. Loss of pulses. Trophic changes and gangrene in the extremities. Often some loss of weight.	Protean. Fever, tachycardia, sweating, loss of weight. Possible symptoms of renal involvement, of abdominal crises, or of other visceral infarctions. Liable to jaundice or to severe hæmorrhages. Polyneuritis. Muscular and joint pains. Liability to recrudescence. Anæmia, often with much leucocytosis and occasionally with eosinophilia.	That of the rheumatic disease.	Fever, sweating, loss of weight, general malaise. Anæmia. Pains in limbs. Very severe headache. Evident arteritis of temporal vessels.
Sex and age incidence.	Almost entirely males—usually young adults or middle-aged men.	Four times commoner in men than in women. Usually in young persons of average age of 30.	Both sexes; usually young persons.	Both sexes. Age over 60.
Type and situation of artery involved.	Usually in deep arteries. Disease affects chiefly arteries of limbs, but also those of viscera to a lesser extent. Typically an acute generalised disease.	Gross nodular lesions in medium-sized and small arteries of muscular type. Occasionally in large arteries. Widespread in visceral vessels. (Central nervous system in only 8 per cent.)	Small arteries, arterioles, capillaries, and vasa vasorum of aorta. Principally in visceral vessels, but much less widespread than polyarteritis nodosa. Lesions chiefly microscopical.	Other arteries besides temporals occasionally involved.
Nature of arterial reaction.	1. Acute stage: patchy lesions; media and adventitia invaded by polymorphs. 2. Chronic stage: much fibrosis in and around vessels; organisation of thrombi and recanalisation and proliferative endarteritis.	1. Acute stage: (*a*) severe medial necrosis, with fibrinous exudation; (*b*) infiltration of all coats with polymorphs, eosinophils, histiocytes, and lymphocytes. Much intimal proliferation. Liability to aneurysmal dilatation and rupture. 2. Granulation tissue in all coats. 3. Scar tissue replacement of arterial wall.	Coagulated fibrinous infiltration of all coats, particularly of the intima. Medial necrosis and occasional hæmorrhage into media. In some acute cases all coats are infiltrated with mononuclears and polymorphs and the intima is thickened.	1. Moderate medial necrosis with occasional hæmorrhage into wall. Round cell infiltration of adventitia. 2. Granulation tissue in all coats with giant cells in media. Intimal thickening and fibrosis.
Periarterial inflammation.	Fibrosis in later stages with matting of arteries, veins, and nerves.	Present in acute inflammatory stage, cellular in nature.	Present. Periarterial cellular and fibrillar stroma with capillary dilatation.	Present.
Thrombosis.	Present throughout disease.	Present from inflammatory stage onwards, causing visceral infarcts.	Nil.	Present.
Involvement of veins.	Phlebitis and periphlebitis both present.	Involvement of veins adjacent to inflamed arteries.	Nil.	Nil.
Progress of disease.	Tends to cause loss of limbs.	Usually fatal within a year. Death from emaciation, hæmorrhage, or infarction of heart or kidneys.	Vascularisation of involved arterial wall, especially in intima.	Some tendency to relapse. Apparent ultimate subsidence.

Arkin (1930). In Arkin's case there were no blood-pressure changes after four years, and yet in a few cases of renal polyarteritis nodosa the pressure changes are so great as to suggest malignant nephrosclerosis (Singer 1927, Friedberg and Gross 1934). Hypertension was present in two of Horton's cases and developed in another, but for the reasons just mentioned, and because of the age of these patients, it would be most unwise to assume that in them the high pressure was evidence of renal arteriolitis. The severe headaches that are a constant feature of all cases of "temporal arteritis" are thought by Horton and Magath to indicate inflammation of the cerebral arteries. If this is so, the term "temporal arteritis" becomes still more inadequate.

Horton and Magath have emphasised the fact that their cases all show recovery and this might be thought to separate this group from cases of polyarteritis nodosa. But Gruber (1925) quotes seven authorities who saw cases of polyarteritis nodosa that appeared to recover. Lindberg (1931) also described a case of recovery in a girl with symptoms as of subacute rheumatism and with superficial nodules of polyarteritis nodosa. He found that of 20 patients with polyarteritis nodosa with subcutaneous nodules about a third were presumably cured. Arkin, in the case of polyarteritis nodosa just quoted, found healing of lesions at the end of four years. This patient died of cardiac and renal failure; and diffuse scarring was found in heart, kidneys, and liver. The first case of temporal arteritis recorded by Horton and Magath (1932) died a similar death two years after the onset of an arteritis which never completely subsided. No autopsy was performed but the similarity is noteworthy.

In the present state of knowledge it is difficult to be sure that there may not be some similar cause in all the groups of arteritis mentioned. It may be that age in some way modifies the inflammation of polyarteritis nodosa, and that it is this modification which is found in temporal arteritis. The temporal arteries are, after all, the only really prominent arteries, and if they are spared during arterial inflammation, the nature of the illness may be entirely misunderstood. A subacute or chronic arteritis in other vessels may have been often overlooked.

SUMMARY

1. Two cases of subacute arteritis of the temporal arteries are described and compared with similar recorded cases.

2. A brief comparison is made of the abnormal and pathological features of polyarteritis nodosa, thrombo-angiitis obliterans, rheumatic arteritis, and "temporal arteritis."

3. A distinction between "temporal arteritis" and polyarteritis nodosa is not possible on clinical, and is difficult on pathological, grounds.

I wish to express my gratitude to Dr. Leslie Cole for permission to use the case notes and diagram. I am also very grateful to Prof. F. R. Fraser, Prof. J. H. Dible, and Dr. C. V. Harrison for help that they

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have given me. I am indebted to the senior medical officer of the London County Council for permission to publish the notes of the first case.

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LEIOMYOMA OF THE STOMACH

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(WITH ILLUSTRATION ON PLATE)

LEIOMYOMATA, said by Boyd (1930) to be the commonest benign tumours of the stomach, receive scant attention in most text-books and are barely mentioned by Beattie and Dickson (1925), while Romanis and Mitchiner (1937) refer briefly to them and remark that they usually cause no symptoms whatever. Ewing (1928), however, quotes previously reported cases, and states that one led to severe hæmorrhage.

Further study of the articles on the subject suggests that the condition is commoner than is generally realised, and that symptoms requiring operation are not unusual. This is of considerable importance, for surgery offers a good prospect of recovery of normal health because most of these tumours are benign. Conway (1936) has made an exhaustive study of the bibliography, and states that 1·2–1·3 per cent. of all gastric neoplasms are benign. He was able to collect 56 recorded cases, and added two from his own experience. In his review it appears that plain muscle tumours are more commonly found in patients over 40 years of age. Some attain a large size—e.g., 5600 g. and 1560 g. They occur in any part of the stomach, and most retain a covering of gastric mucosa if they grow inwards, but they may also grow outwards and become covered by peritoneum. Three examples have been described recently by Denham (1936) in this country, and by Lindquist and Mock (1937) and Hartman and Camp (1937) in America. These three cases resemble ours in many respects, and the tumours were successfully removed.

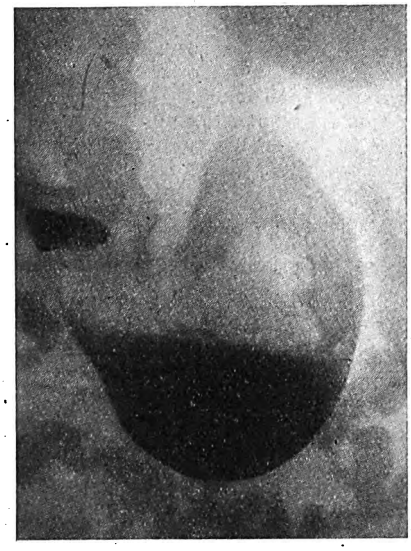

FIG. I.—Radiogram of stomach showing appearance of tumour (Oct. 28th).

FIG. II.—Section of tumour.

CASE REPORT

A housewife, aged 59, was sent for consultation and gave a history of gradual loss of weight for about 9 months; for 2–3 months she suffered from nausea, intermittent vomiting, and epigastric pain; this was most severe about 1½ hours after meals and was relieved by food. Latterly epigastric discomfort was constant. She also stated that for many years "she has had to be careful of her diet." No melæna or hæmatemesis had ever been noted.

Examination revealed nothing more than an indefinite fullness in the epigastrium. The cachectic appearance usually associated with gastric carcinoma was lacking, and wasting was not severe. Fractional test-meal: complete achlorhydria; blood was present in all the specimens except one, and starch was absent in 2½ hours; no free acid in response to histamine injection.

Radiography (Dr. C. M. Rigby): A large filling defect was found, but the appearances were evidently unusual and a second screening again showed a large filling defect, but it was observed that peristalsis was little affected (Fig. I). On this ground, and because of the relatively good condition of the patient and the complete absence of evidence of metastasis, a benign condition was considered probable.

Operation (Nov. 8th, 1937).—On opening the abdomen the stomach was found to contain a mobile tumour about the size of a tennis ball. On further examination it was seen that the tumour was growing from, and had invaginated, the lesser curve at the junction of its upper and middle thirds. There was no fixation of the gastro-hepatic omentum, and no secondaries were evident in the regional glands or liver. The stomach was opened on its anterior surface and the tumour exposed. It was considered that the degree of mobility of the mass was strongly against malignancy, and as the patient was not a very suitable subject for a partial gastrectomy, the tumour and a small area of stomach were excised with the diathermy knife. The two incisions in the stomach were then closed. The patient made a good recovery and went home on Dec. 3rd.

Pathology.—The mass was ovoid in shape and measured 8·5 by 6·5 cm. and weighed 145 g. (Fig. II). Around its attachment to the stomach wall the gastric mucosa could be seen to be reflected on to the surface of the tumour. By far the larger part of the surface of the mass was, however, ulcerated. Congestion and hæmorrhage were obvious. Microscopically, apart from dilated blood-vessels, areas of hæmorrhage, and surface inflammation

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the bulk of the tumour consisted of plain muscle; fibrous tissue was very scanty (Fig. III on Plate). The cells and their nuclei were blunt ended and stained brown by van Gieson's method. Mitoses were not numerous and the vessels were well formed. The tumour was therefore reported as being a leiomyoma with superficial ulceration and scattered areas of hæmorrhage.

DISCUSSION

Several points appear worthy of comment. This woman was in the cancer age, and her symptoms and the clinical findings at first glance suggested carcinoma. Had the mass been malignant, it would in all probability have been inoperable. It should perhaps be mentioned that a Bendien test (sodium vanadate method) performed on this woman's serum before operation gave a positive result. This was done not as routine but because the case was recognised as unusual. Whether the tumour removed will subsequently recur is a matter for speculation, especially as Lindquist and Mock in their paper remark that apparently benign leiomyomata may metastasise. The Bendien test is believed to be unreliable, but the finding is interesting. As the normal peristalsis observed in the stomach by X ray was also noticed in Denham's case and in that of Lindquist and Mock, the finding is evidently of diagnostic significance. Comparative healthiness in a patient showing a large gastric neoplasm should also suggest a benign lesion.

We wish to express our thanks to Dr. J. Menton, the county pathologist, for his help and advice, and to Mr. W. H. Fussell for his assistance in the preparation of the photomicrographs.

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SURGICAL TREATMENT OF BELL'S PALSY

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In a previous communication (Morris 1936) I discussed in general the localisation of lesions of the VIIth nerve causing facial paralysis, and the modern methods of treating such paralysis, with special reference to the method devised by Duel and Ballance by grafting nerve from other sources to repair injury occurring especially during the operation of mastoidectomy. Since then I have had the opportunity of operating on a number of these cases, with encouraging results.

Recovery, according to Duel, can be expected up to a period of two years following the insertion of the graft. The first of my cases in this series was operated on in April, 1936, so I am not, at present, in a position to present a review of the results obtained so far. Suffice it to say that in some of the cases where there had been complete section of the nerve and a graft inserted, there is definite evidence of re-enervation of the facial muscles already. The purpose of this paper is rather to stress the importance of Duel's decompression operation in cases of Bell's palsy.

A paper read by Charles Bell before the Royal Society of London in 1821 described various experiments that he carried out, in which the facial nerve was severed in asses and dogs.

He states that "the animals so treated suffered no pain, but, on exertion, the side of the face on which

FIG. 1.—From cinematograph films taken (*a*) on day before decompression and (*b*) winking on affected side 6 weeks later.

the nerve was divided, did not move as did the other side." This led him to call the VIIth nerve the nerve of respiration of the face. He was criticised for this, but maintained his view by pointing out that muscles of the chest and shoulder were used when respiration became embarrassed, and brought these muscles also into the group of accessory respiratory muscles. It seems probable that he was unable to distinguish motor from sensory nerves, from his observations on section of the Vth nerve. He could, apparently, distinguish a supranuclear from an infranuclear lesion, and he describes cases of facial paralysis after fracture of the base of the skull and after operation on pre-auricular tumours and abscesses.

So, from this early beginning, the name "Bell's palsy" has been applied indiscriminately to infranuclear lesions of the nerve causing facial paralysis. From then onwards, although many cases were reported, no effort was made to ascertain the cause of the condition that we now call Bell's palsy, and to all practical purposes our knowledge of this has not advanced materially to-day. Hunter Tod defined Bell's palsy as facial paralysis following exposure of the face to abnormal heat or cold and unaccompanied by any evidence of middle-ear infection or deafness. Duel went further and described the condition as being due to congestion or inflammation of the nerve in the dense bony portion of the Fallopian aqueduct—i.e., in the portion between the horizontal canal of the labyrinth and the stylomastoid foramen. From what I have observed in the early cases on which I have operated, I am in no doubt that this is so. Exposure of the nerve in this portion, therefore, with consequent decompression, will relieve the pressure on the nerve-fibres and allow impulses to pass through unimpeded. The earlier this is done, the less danger will there be of permanent impairment of muscle function.

The choice of the cases in which this procedure should be carried out is not, however, a simple matter. We know that a great number of cases of Bell's palsy recover completely with the help of massage and electrical stimulation. In fact, until now, I think most aurists, having made the diagnosis, simply transferred the case to the department of physical medicine, feeling that they had done all that could be expected of them. If the case recovered, well and good. If the recovery were incomplete, it was

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bad luck for the patient, but nothing more could be done. Partial recovery is the bugbear of these cases. In the past no surgeon would have cared to recommend a patient to risk what partial recovery there was for the uncertain result of anastomosis with the

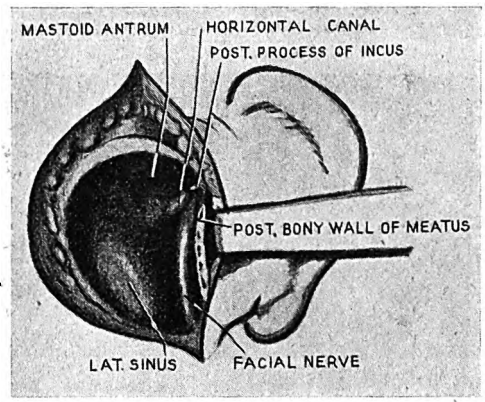

FIG. 2.—Appearance at operation, showing œdematous and inflamed exposed nerve (same case as Fig. 1).

spinal-accessory or hypoglossal nerves. The decompression operation obviates this risk. There is no reason why, if the decompression is carried out carefully, there should be any injury to the nerve at all, and the hearing will not be interfered with.

INDICATIONS FOR DECOMPRESSION

In which cases then should decompression be advised? In a series of twelve patients on whom I have operated in the past year I have found certain points that help to solve this problem.

The earliest case was in a girl aged 12, who had had complete right facial paralysis for six weeks with no return of voluntary movement. There was faradic response and the reaction of degeneration was not obtained. Fig. 1a and b is a "still" from a cinematograph record taken the day before operation. The notable features are the more widely open eye on the affected side, the watering of the eye, and the complete loss of movement when smiling. A simple decompression was carried out and the nerve was found to be œdematous and inflamed-looking, and bulged over the edges of the exposed canal (Fig. 2). On the day after the operation she could close the affected eye completely and in four weeks recovery was complete. Fig. 1 b, in which she is winking with the affected eye, was taken six weeks after operation.

The next earliest case was in a girl aged 17, who had complete paralysis of the right face for two months with no voluntary movement. The onset was accompanied by a spontaneous abscess of the nasal septum. The septal abscess was dealt with when she was first seen. After two months' observation I decided to decompress the nerve. Fig. 3 a is from a film taken the day before operation. Fig. 3 b and c were taken five weeks later.

Critics of the method have already asked "if these cases had been left alone and treated by massage, &c., would they not have recovered?" In my opinion, if they recovered at all they would not have made a complete recovery, and would have gone through life with obvious weakness of that side of the face which would have been apparent to everyone. It is my experience that the cases which are going to recover without treatment, other than massage and electrical stimulation, do so in from a few days to two or three weeks. At any rate at the end of this period there is very definite evidence of beginning recovery. If this is delayed as long as six weeks or more, it is my opinion that there is never complete recovery.

I have started, therefore, by taking six weeks as the limit of time for which I think a case should be treated expectantly. If at the end of six weeks there is no evidence, or very little, of recovery, I recommend the decompression operation, which offers the only hope of regaining a normal facial expression. Several of the cases under review were referred to me after months, and in two cases after years, of massage and electrical treatment. In all of them there had been partial recovery in the early stage, and then they had come to a standstill. In the earlier cases of this group, those with paralysis for from six months to two years, the nerve on exposure still appeared too large for the canal, and the process of recovery of muscle function was slow but quite definite.

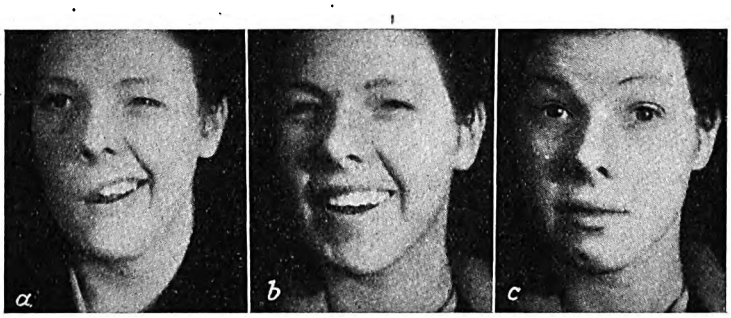

FIG. 3
From films taken (*a*) on day before decompression and (*b*, *c*) five weeks later.

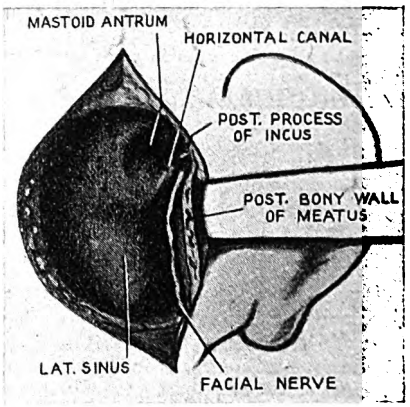

FIG. 4.—Condition of nerve after 8 years' palsy. Decompression followed by recovery.

The case with the longest history on which I have operated so far was a bilateral Bell's palsy of 8 years' duration. There had been very incomplete recovery for a year, but none after that. On exposure the nerve appeared as a white fibrous cord with a series of nodules in its course, which suggested small neuromata (Fig. 4). The nerve, in between these nodules, was thinner than normal. I incised the sheath, and it was obvious the next day that in so doing I had, either by damaging the existing fibres or by nerve shock, given the patient a complete paralysis again. After four weeks there was quite definite evidence of

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recovery, and now, four months after the operation, the operated side is far in advance of the other.

ÆTIOLOGY

As regards the causation of Bell's palsy, I have made attempts, on incision of the sheath, to cultivate an organism, but without success so far. In 1932 Brain and Aitken at the London Hospital collected a series of patients with facial paralysis, which were

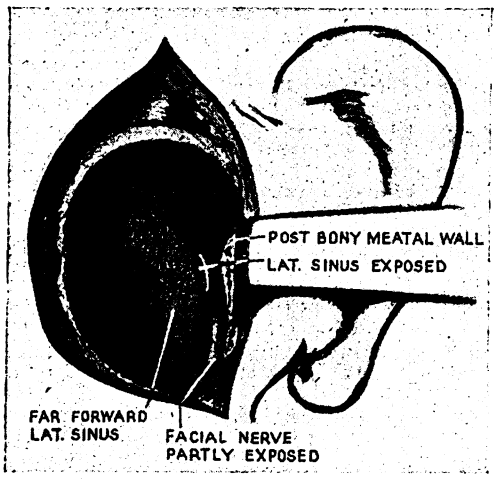

FIG. 5.—Appearance of lateral sinus in far-forward position.

then described as cases of Bell's palsy, and they endeavoured to prove that the paralysis was due to zoster infection of the geniculate ganglion. In their first group they describe cases in which there was an herpetic eruption of the skin of the meatus or concha supplied by the VIIth nerve. They say:—

"Netter and his colleagues have produced evidence that the serum of zoster convalescents contains a specific antibody whose presence can be detected by the complement-fixation reaction, using as antigen diluted zoster vesicle fluid. . . . The observations of Bedson and Bland . . . support Netter's claim. . . . Zoster may therefore be regarded as an infection with a specific virus, which leaves evidence of itself . . . in the form of antibodies in the serum, and if any cases of Bell's palsy are due to this virus the complement-fixation reaction should reveal evidence of this."

The term Bell's palsy is used rather loosely according to our ideas to-day. In their first group they obtained a positive result to the complement-fixation reaction in all cases in which an herpetic eruption had been observed. But they neglected to test the hearing of the patients and thereby lost a great opportunity of further localising the lesion, since if the geniculate ganglion were the site of the lesion the nerve to the stapedius muscle would have been involved and the air-conduction hearing impaired.

I am prepared, however, to accept the cases in this first group as those of zoster infection of the ganglion, and as such they should not be included under the heading of Bell's palsy. In their second group, where no skin eruption was observed, they invariably failed to obtain a positive complement-fixation reaction. Here, again, no hearing test was carried out, but in my opinion the cases in this latter group can safely be designated Bell's palsy according to the modern conception of the condition.

A purely technical difficulty that I have had is with the occasional far-forward position of the lateral sinus. Normally this should be about ¼ in. posterior to the posterior bony meatal wall. It is common knowledge that its position may vary within wide limits. Occasionally I have found it close up to the meatal wall with the mastoid antrum deep to it and quite inaccessible without sacrificing the sinus. It is my experience that this commonly occurs in the dolichocephalic type of skull and when there is a long history of middle-ear suppuration. In this latter class the mastoid process has become sclerosed and consists of solid bone, and commonly the sinus is abnormally far forward. The exposure of the nerve in these cases is a problem and it is one that I have not as yet solved. In the series under review I have met with two cases, the first of which I have tried to illustrate in Fig. 5.

In two other patients in the series, X ray examination showed a cellular mastoid process on the unaffected side and a sclerosed process on the affected side.

CONCLUSIONS

At present I regard a period of six weeks to two months as the limit of time a case of Bell's palsy should be treated expectantly, when there is no evidence of voluntary movement of the facial muscles. If faradic response is lost, or the reaction of degeneration can be obtained before this, the sooner decompression of the nerve is carried out the more chance has the patient of complete recovery.

Where a paralysis has been treated expectantly with some recovery, and then come to a standstill, further improvement may be anticipated by decompression and, in the longer cases, introduction of an "inlaid graft," which by chemotaxis will stimulate the existing active fibres of the nerve.

Further than this I am not prepared to go at present, but it is, I think, common ground that in no case should the operation be attempted where the presence of muscle tissue cannot be demonstrated.

In the series under review, the earliest case operated on was of 6 weeks' duration without any demonstrable recovery. In the patient with the longest paralysis it was of 8 years' duration. In only one patient in the series has there been no evidence of improvement after simple decompression, and in this I was uncertain of the diagnosis at the time I examined her. She had a history of facial "tic," resulting in facial paralysis, and I mention her only because she was operated on in the series. [Since writing this, I have had an opportunity of seeing this patient again after an interval of three months. She is now recovering rapidly, especially in the lower division.]

It is therefore true to say that in all the cases in this series there has been recovery, complete in the early ones and partial, at the time of writing, in the long-standing ones.

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HOSPITALS DAY.—Last year at the suggestion of the Commissioner of Police of the metropolis 108 hospitals in Greater London agreed to unite their many flag-days and street collections in one effort. The total sum collected was over £32,500, which is more than these hospitals formerly derived from their individual flag-days. This year 135 hospitals are coöperating. The general hospitals in inner London will hold their day on Tuesday, May 10th; the general hospitals in outer London on Saturday, May 14th; and the special hospitals on Tuesday, Oct. 11th. The central committee for the collections may be addressed at 36, Kingsway, London, W.C.2.

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THE ACTION OF CURARINE ON RESPIRATION

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In recent years there have been a number of reports of the use of curares and their derivatives, especially curarine, in the treatment of chronic muscular rigidities of pyramidal and extrapyramidal origin, and in the treatment of acute tetanus (West 1932, 1935, Cole 1934, 1935a, Mitchell 1935). In 1936 in a paper on the use of intravenous curarine I recorded bronchial spasm as a danger to the patient (West 1936). This spasm may come on very suddenly, and is independent of the presence of tetanus, for it occurred in a case of parkinsonian rigidity. Its danger is moreover not limited to curarine; I have seen respiratory embarrassment, which I believe to have been of the same type, in a patient with spastic paraplegia who had been given an extract of a calabash curare subcutaneously.

The clinical picture of curarine respiratory spasm is a peculiar one. The patient referred to above was partially, but by no means fully, curarised when it developed, and this is characteristic. She had complained of drooping of the eyelids, mistiness of vision, and difficulty in raising her head from the pillow. These are early signs of curarisation. But her spasticity had not fully relaxed, and at the onset of the spasm she had considerable, though diminished, power in her arms and legs. On being sat up she had diplopia lasting ten minutes. No further weakness appeared. The patient described her sudden difficulty of breathing: "as if I had to make a great effort to draw in a breath or I would be unable to breathe again." The dyspnœa is inspiratory, the chest remaining in full expiration between short effortful breaths in which the accessory respiratory muscles are used.

In a case of very severe tetanus seen in 1937 curarine was given by slow intravenous inflow with a Henry and Jouvelet transfusion pump. A maximum of 600 c.cm. of fluid was given in each six-hour period, and each 600 c.cm. contained 100 mg. of curarine and 1/50th grain atropine. Generalised spasms, which had been increasing in severity and frequency during the four hours before curarisation, were held in abeyance for seventeen hours, and the patient remained curarised sufficiently to relax the jaw during most of that period. Subsequently, as in other cases, the tetanus spasms began to appear despite the curarisation, and rapid deterioration with cyanosis and cardiac failure took place. During the last hours of the patient's life curarisation was first stopped, and then, after one or two severe convulsions, deepened. It was after this that a respiratory spasm occurred as to the cause of which I was uncertain. It was sudden; the chest remained in expiration. Oxygen was given in an increasingly strong stream through an endotracheal catheter, but there was very little change in the deep cyanosis, although the heart continued to beat strongly for some minutes. At the autopsy the lungs were found to be massively collapsed. Oxygen had penetrated the tracheal walls and caused subcutaneous emphysema of the areolar tissue round the root of the lung, and of the neck, face, posterior abdominal wall, and scrotum, although no puncture caused by the catheter could be found and there was no sign of a positive pressure in the thoracic cavity itself.

Curarine bronchial spasm had been suspected from animal experiments (West 1935), but had only been found in the perfused tracheal ring of rabbits and cats when curarine was present in quite disproportionately high concentrations (West 1937). Obtained thus, however, it was removed by adrenaline, suggesting that the action might be of the histamine type. Since seeing the case of tetanus recorded above, I have made further experiments in animals (West 1938), and these throw more light on this dangerous action of curarine. They may be briefly summarised as follows:—

(1) In guinea-pigs, which were chosen for their known bronchial sensitivity to histamine, curarine produces retraction, blanching, and diminished expansion of the exposed lungs in the pithed animal. The lungs were ventilated by internal inflation and the pressure required for distension noted. The effects were seen with dosage comparable with that given to man (0·1 mg. per kg.), and were antagonised by adrenaline. Curarine can thus exert a direct action on the lung, which resembles (but is not identical with) histamine bronchoconstriction.

(2) Curarine in dosage of this sort has also a curariform action, from which the respiratory muscles are not exempt. The diaphragm becomes weakened, losing both its tone and its power of contraction, and rises into the thoracic cavity. Radiograms of curarised rabbits and cats show that the chest volume is diminished not only on inspiration but also in expiration. Measurements of intrapleural pressures show that the normal "negative" pressure is almost or quite abolished under these conditions—an effect particularly noticeable in horizontal or inverted postures, when the abdominal viscera can press upon the flabby diaphragm.

(3) The fall in the negative pressure which normally assists the distension of the lung may be expected to increase the effect of bronchoconstriction when this occurs. For normally this negative intrapleural pressure acts as a bronchodilator when the lung is at rest, and still more so during inspiration.

The effect of these combined factors in curarine poisoning is well shown in the following observation. A curarised cat cannot be artificially respired by the method of chest compression in the horizontal posture, at a time when air will enter the lungs freely after such compression in the vertical (head-up) posture. This is due to an inability to secure an adequate negative intrapleural pressure except with the traction on the diaphragm produced by the vertical posture. In control experiments very similar pressure variations may be produced by arrest of respiration by an overdose of ether in a cat under chloralose anæsthesia. But in that case artificial respiration can still be performed, for the direct bronchoconstrictor action is absent.

The same mechanism doubtless applies to man. A patient with progressively weakening inspiratory power, and an intrapleural negative pressure which is falling, is not in a condition to resist the action of a bronchoconstrictor drug. It is presumably because of the partial curarisation that these particular attacks of dyspnœa are inspiratory, in contrast with the usual appearance of a distended chest which asthma and histamine spasm produce. There is experimental evidence that adrenaline might remove the attack, and that atropine in large doses might prevent it. But curarine respiratory spasm may be so catastrophically sudden in its onset as to render remedial measures useless. From my own experiences with this alkaloid, I do not think it can be made of aid to cases of chronic pathological rigidities in dosage which is safe. Further, I gravely doubt if

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in its present form curarine can be made a practicable remedy for cases of acute tetanus that are inaccessible to recent remedies such as Avertin anæsthesia (Lawen 1928, Lindemann 1929, Momberg and Rotthaus 1929, Cole 1935b).

Finally, it may be noted that there has been increasing reason to regard curarine as being not a pure alkaloid but a mixture. Whether produced from calabash curare or direct from *Strychnos toxifera* it has failed to crystallise (King 1935). Quite recently a more powerful curarising alkaloid (Toxiferin) has been crystallised from calabash curare, though not as yet from *S. toxifera* (Wieland 1937). If the direct bronchoconstrictor action of curarine should be due to an impurity, the absence of this from toxiferin might possibly give the latter a place in therapeutics which we must deny to curarine.

SUMMARY

Curarine and some curares may produce a dangerous respiratory spasm. Sudden inspiratory dyspnœa occurs, breathing may be arrested, and difficulty of artificial respiration by chest compression and by endotracheal oxygenation suggested the presence of bronchial spasm. In a case of acute tetanus treated with curarine collapse of the lungs was found at autopsy.

Animal experiments show that curarine can in fact exert a direct constrictor action on the bronchi, and that the effects of this are increased by partial curarisation of the respiratory muscles. Not only is the partly curarised diaphragm weakened in its inspiratory contraction, but its resting tone falls; it rises into the chest cavity, and, in consequence, the "negative" intrapleural pressure falls. The result is a reduction of the bronchodilator action of the normal distributions of pressure within the chest cavity, in expiration and in inspiration.

Curarine is probably not a pure substance (King). A purely curarising alkaloid—perhaps to be found in "toxiferin" (Wieland)—by lacking the direct bronchoconstrictor action might increase a margin of safety in curare therapy, which in the case of curarine is too small to justify its employment.

I am indebted to Dr. Purdon Martin for permission to see the case of tetanus mentioned in the text, and to Dr. J. G. Greenfield for the autopsy.

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CLINICAL AND LABORATORY NOTES

CHRONIC DUODENAL ULCER IN A CHILD OF SIX YEARS

WITH FATAL HÆMORRHAGE AFTER APPENDICECTOMY

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A BOY aged six was admitted to the Cardiff Royal Infirmary on Oct. 3rd, 1937, complaining of upper abdominal pain, vomiting, and constipation of about 24 hours' duration.

On four occasions during the previous two years the child had had attacks of vomiting associated with sore-throat and fever. There was no abdominal pain, hæmatemesis, or melæna during these attacks and, with the administration of alkalis and glucose, they subsided in two or three days. On admission the child looked ill, the temperature was 103° F., the pulse-rate was 120 per minute, and the tongue was coated. The abdomen was tender in the region of the right iliac fossa but there was no rigidity.

At *operation* acute appendicitis was found and appendicectomy performed. The appendix contained two stercoliths, one of which had ulcerated almost through its wall, and, in addition to an acute suppuration, there was histological evidence of a chronic inflammation.

During the first two days after operation the temperature returned to normal and the general condition improved. On the third day the temperature rose to 99·7° F., the pulse became poor, and the child grew restless. During the early morning of the fifth day he vomited altered blood and passed tarry stools, the pulse becoming feeble and rapid. Hæmoplastin and horse serum were administered and a blood transfusion was given. On the sixth day he collapsed, vomited bright red blood, and shortly afterwards died.

Post mortem a chronic peptic ulcer was found on the posterior wall of the duodenum 9 mm. beyond the pylorus. It had penetrated the entire thickness of the gut and eroded the gastroduodenal artery causing hæmorrhage. The ulcer was oval in outline, measuring 15 by 9 mm., and its sides were funnel-shaped but there was some overhanging of the mucosa. The floor was formed by the pancreas. In the region of the ulcer there was induration of the tissues and the duodenum was firmly adherent to the pancreas. Microscopic examination showed a moderate degree of fibrosis indicating an ulceration of some standing. The stomach contained a large quantity of blood clot and there was much altered blood in the intestines. In the region of the cæcum were many recently formed fibrinous adhesions and amongst them a small abscess. The omentum, which was lying in the upper abdomen, was not adherent to any of the structures, but it contained a small abscess in its folds. The tonsils were somewhat enlarged; the remaining organs were pale but otherwise normal.

Stewart believes that the process of peptic ulceration from its onset to the time of complete perforation of the muscular coat occupies at least two months (Hurst and Stewart 1929). In the case here described the presence of firm adhesions and some fibrotic induration of the parts, in addition to complete perforation, suggests a process of somewhat longer duration. Before the hæmatemesis occurred there were no definite signs of peptic ulcer; the attacks of vomiting described in the history may have been referable to the chronic appendicitis.

Ulcer of the stomach and duodenum in infants and children has often been recorded, but the ulcers have seldom been of the chronic peptic type. Proctor (1925) found records of only 19 undoubted cases in the first fourteen years of life. In 3 of these (one male) the ulcers were duodenal; in 5 (all female) the position of the ulcer was not stated. Proctor also analysed 6664 cases of chronic duodenal ulcer observed at the Mayo Clinic from 1906 to 1924 and

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he found only 2 in children under fourteen years of age, 1 of which was not confirmed by autopsy. Hurst and Stewart (1929) in 200 cases of chronic peptic ulcer found none in the first decade of life and only 8 in the second. Miller and Gage (1930) report a case of chronic cicatrising duodenal ulcer in a girl of seven. Bloch, Bronstein, and Serby (1932) describe 4 cases of chronic duodenal ulcer, diagnosed by radiography, in 3 girls aged respectively five, nine, and eleven and 1 in a boy aged thirteen. Smyth, Crymble, and Allen (1934) record a case in a girl of ten.

Moynihan (1920) considered that the symptoms of chronic peptic ulcer could often be traced back to the age of ten years or earlier and Barford agrees with this. Proctor examined 1000 cases of duodenal ulcer seen at the Mayo Clinic and found 26 with symptoms dating back to childhood. He suggests that this condition may be commoner in the earlier years of life than is generally supposed.

I am much indebted to Prof. Lambert Rogers and Dr. Gordon Jones for supplying me with the clinical history.

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POST-PARTUM MACROCYTIC ANÆMIA ASSOCIATED WITH CONFUSIONAL STATES

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THE form of mental disorder occurring in pernicious anæmia varies from mere alteration of character or disposition to more or less paranoid, manic, depressive, or confusional reactions. A delirium with unpleasant hallucinations is recognised as being one of the commonest types, and is illustrated by the first of the two cases here reported.

FIRST CASE

A married woman aged 38 was admitted on a temporary basis on June 9th, 1937. There was a history of pregnancy toxæmia with a blood pressure of 208 mm. Hg and albuminuria. Labour had been surgically induced and a stillborn infant of 30 weeks was delivered on June 5th. She had aural hallucinations on the 8th, complaining that other patients were whispering against her; green lights worried her. She became very distracted and noisy. No family history of insanity. Previous history: Four pregnancies without toxæmia.

On admission she was confused, amnesic, and disorientated. She was greatly frightened by unpleasant aural and visual hallucinations. She saw her husband being put into a sack and burned alive and then heard his voice from beneath the mattress. She was very distressed, aimlessly restless, and frequently shouted for the police. The relevant physical findings were: Very pale skin; radial artery thickened; heart-rate, 120; blood pressure, 130/90 mm. Hg; albumin and granular casts in urine; no signs of involvement of the central nervous system.

Blood count:

Red cells ..	1,656,000	White cells ..	10,630
Hæmoglobin ..	38%	Polymorphs ..	85%
Colour-index ..	1·15	Arneth index ..	2·73

Reticulocytes, 16 per cent.; polychromasia, severe microcytosis, macrocytosis, and poikilocytosis; normablasts present.

Blood: Kahn and Meinicke negative. Fragility of red cells: in 0·38 per cent. saline. Pyrexia on one day only (99·4° F. on the 12th). The patient was put on mist. ferri et ammon. cit., gr. 30 t.i.d., and intramuscular injections of 2 c.cm. Hepol daily.

Progress.—June 14th: No longer hallucinated, but somewhat perplexed by her past experiences; generally retarded and had no clear idea of time; lay quietly in bed. 16th: Red cells 2,341,00, hæmoglobin 44 per cent., and colour-index 0·98; reticulocyte crisis of 37 per cent. 23rd: Red cells 3,458,000, hæmoglobin 68 per cent., and colour-index 0·98; reticulocytes 1·6 per cent.; she had gained insight, and remained lucid and calm; occupied herself. July 14th: Injections of hepol reduced to alternate days. 19th: Red cells 4,265,000, hæmoglobin 82 per cent., and colour-index 0·96. She was discharged as recovered on July 21st.

SECOND CASE

A married woman aged 40 was admitted on a certified basis on Jan. 22nd, 1937. There was a history of full-time parturition on Dec. 1st, and the patient is reported to have become rambling and disconnected in her talk a week later. Previous history: Two uneventful pregnancies. No insanity in family.

On admission she was confused, took no notice of what was said to her, and was aimlessly restless. She muttered disconnectedly to herself, had to be hand-fed, and her habits were faulty. The relevant physical findings were: Icteroid tinge of skin; blood pressure 85/50 mm. Hg; no involvement of the central nervous system; several septic areas on right hand and foot.

Blood count:

Red cells ..	2,083,000	White cells ..	5750
Hæmoglobin ..	45%	Polymorphs ..	69%
Colour-index ..	1·08	Arneth index ..	2·48

Reticulocytes, 0·53 per cent.; severe microcytosis, macrocytosis, and poikilocytosis; normoblasts present; polychromasia.

Blood: Kahn and Meinicke negative.

Progress.—Jan. 25th to Feb. 5th: 2 c.cm. hepol intramuscularly daily. Jan. 31st: Red cells 2,600,000; reticulocyte crisis of 9 per cent. Feb. 6th: No mental improvement; remained noisy, confused, difficult with food, faulty in habits; red cells 2,558,000; reticulocytes 1·8 per cent. Hepastab 2 c.cm. intramuscularly daily, until the 17th. Feb. 9th: Red cells 2,664,000; reticulocyte crisis of 7·8 per cent. 15th: Put on mist. ferri et ammon. cit., gr. 20 t.i.d. On the 16th she developed erysipelas of the face; temperature 103° F., pulse-rate 140, respirations 28. 17th: Red cells 2,576,000; reticulocytes 0·58 per cent.; she remained restless, noisy, and excited. On the 20th she was isolated as a diphtheria carrier; inoculated with 0·5 c.cm. alum-precipitated toxoid. On the 28th she developed broncho-pneumonia, and on March 11th left femoral thrombosis, with considerable œdema of left lower extremity. A right parotitis began on March 14th, but by April 4th both lung and parotid conditions had cleared. She was still restless, noisy, and confused; red cells 2,300,000, hæmoglobin 48 per cent., and colour-index 1·04. April 6th: Given ½ lb. liver daily, and from the 23rd to 28th, intramuscular injections of liver extract (Ferris). May 25th: Red cells 3,958,000, hæmoglobin 73 per cent., and colour-index 0·92; she was no longer excited or noisy; still confused, but beginning to employ herself. June 28th: Red cells 4,575,000, hæmoglobin 85 per cent., and colour-index 0·92; mental improvement continued. Could occasionally answer relevantly, but was not clear about time and had some amnesia; occupied herself very usefully. On July 20th tonsillectomy was performed to cure the carrier condition and she was discharged recovered on Oct. 4th, after four weeks absence on trial.

In these days of a returning belief to synergic ætiology—a phrase I borrow from Crichton-Miller [1]—I would not advance that the anæmia in these two cases was the sole causative factor. Other causes—psychological, a certain degree of infection, and pregnancy toxæmia in the first patient—cannot be accurately evaluated, but it is noteworthy that in

[1] Crichton-Miller, H. (1937) *Brit. J. med. Psychol.* 16, 171.

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the second patient the mental improvement ran closely parallel with a return to a normal blood condition. Another interesting feature of this case is the delay in the beneficent reaction to liver therapy because of continued infection of one sort or another.

I wish to thank Dr. V. L. Connolly, the medical superintendent, for permission to publish these reports.

EVIPAN SODIUM IN THE TREATMENT OF TETANUS

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The use of Evipan Sodium in the treatment of tetanus has already been described by Heard (1934), Hoche (1935), and Walzel (1935), but as the total number of cases so treated is only 19 a further report may be of interest. Thanks to intensive cultivation of the soil, ignorance of the potential danger of soiled wounds, and reluctance to go to hospital, tetanus is frequently seen in Barbados, often in advanced stages.

I have found chloroform unsatisfactory, both for stopping convulsions and as an anæsthetic for antitoxin injections, enemata, and the cleansing of infected wounds. Moreover its administration requires a skilled assistant. The advantage of evipan sodium is that after giving the injection the surgeon is free to perform the necessary local and specific treatment and needs only semi-skilled assistance.

The injection is given in the normal manner, but the needle is inserted above the fold of the elbow, in case the stimulus should provoke a convulsion and flexion of the arms. In 5 of my 6 cases 10 c.cm. (= 1 gramme) of evipan sodium was given, in disregard of the weight, age, and condition formula suggested by Specht (1933); the other patient, a child of four, received 4 c.cm.

Antitetanic serum may be injected intravenously through the same needle, left in position for the purpose. The patient is then rolled over and the intrathecal dose of antitetanic serum given. Septic wounds can now be cleaned, suspicious puncture wounds opened up, and eusol dressings applied or changed.

After a dose of 1 g. of evipan sodium the patient usually continues to sleep, or at least remains drowsy, for two or three hours. As the sleep becomes lighter, chloretone (40 grains dissolved in an ounce of olive oil) may be given per rectum, and this usually prolongs the drowsiness for the rest of the day. The first evipan injection is given immediately after admission to the wards; on subsequent days it is given in the morning so that the combined action of evipan sodium and the chloretone may exert their effect throughout the day. In severe cases of tetanus it is possible that the attacks may recur later in the day, after the combined effect of the evipan sodium and chloretone has worn off. I myself have not seen such cases, but Walzel describes five, two of which were given a further injection of evipan sodium which controlled the attack.

I have not found it necessary to continue administration of evipan sodium for more than three days. Occasionally it may cause mild excitement at night. This is readily controlled by giving morphia, as recommended by Haller (1936) and McNelis (1936). In my experience the injection does not provoke a tetanic attack.

I am indebted to Dr. H. G. Massiah, visiting surgeon to the Barbados General Hospital, for permission to investigate the cases.

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MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF THERAPEUTICS AND PHARMACOLOGY

This section met on Feb. 8th with Dr. J. W. Trevan, the president, in the chair.

Sex Hormones in the Urine

Mr. R. K. Callow, D.Phil., read a paper on the significance of the excretion of sex hormones in the urine. He pointed out the error of the impression often gained that recognition of hormone activity in the urine and subsequent isolation of active compounds constituted identification of the primary hormones. A distinction must be drawn between the compounds whose presence had been proved in the endocrine glands and those modified compounds excreted in the urine which might or might not retain some part of the original activity. Œstrogens in the urine were derived from the known active compound in ovaries by a process of oxidation. Progesterone, isolated from corpora lutea, appeared to be reduced and completely inactivated when excreted. Testosterone, the only male hormone extracted from testes, was not isolated from urine: the known urinary androgens were compounds which could be derived from testosterone by a combination of oxidation and reduction, and one of them, at least —namely, dehydro-androsterone—was more probably derived from the adrenal. The adrenal glands contained a family of compounds chemically related both to the androgens and to progesterone. Considering the close chemical relation of all these compounds derived from the ovary, placenta, testis, and adrenal, it was not surprising that various hormonal activities could be detected in extracts from any one gland, and the problem of assigning a source to an excreted product was not simple.

A further test of the significance of excreted hormone activity was to examine the excretion when hormones were administered. The number of organs and processes which might be involved in the metabolism of hormones was such that examination of the urinary waste-products alone gave information about only one of many variables. Experimentally, œstrin activity had been recovered only to the extent of 3–12 per cent. Administered progesterone was recovered in the urine as the inactive compound pregnanediol in amounts equivalent to 12–46 per cent. of the hormone given. From investigations by Dr. Callow and his collaborators it appeared that moderate amounts of administered male hormones were destroyed completely by the body, and only after large doses was an increase perceptible in the androgen activity recoverable from the urine.

Yet another set of facts complicating the problem was the excretion of "male" and "female" hormones by both sexes. Early views of the sexual specificity of hormones had been modified, since the occurrence of œstrus-producing hormone in male blood had been accepted reluctantly and even

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interpreted as evidence of a physical basis of homosexuality. It was now recognised that œstrogens were excreted by men of undoubted virility and œstrone occurred in the urine of stallions in amount sufficient for isolation. The assay of androgens in urine, investigated by Dr. Callow and his co-workers, had given results bearing directly on this subject. The methods of extracting urine had been investigated, and the method of assay by measuring comb-growth in capons had been supplemented by a chemical method based on a colour reaction which was both rapid and sensitive and gave results consistent with the other method. Whilst normal men excreted on the average more androgen than normal women, the limits for the two sexes overlapped widely. The amounts excreted by ovariectomised women, eunuchoids, and, particularly, eunuchs, precluded any correlation of androgen excretion with sexual condition. In cases of Addison's disease the androgen excretion was low. A relation of androgen excretion to adrenal function was shown strikingly in certain cases of a series of hirsute women. In many of these the correlation of hirsutism with androgen excretion was irregular, but adrenal hyperplasia was associated with high values, in agreement with other workers' results, and in cases of adrenal tumour the androgen excretion was very large indeed, and chemical investigation had led to the isolation of the androgenic compound dehydro-androsterone, which was regarded on this account as a product of the adrenal.

Apart from circumstances in which the body was flooded with an excess of hormone, as in pregnancy or with certain tumours, the assay of sex hormones was an uncertain aid to diagnosis. Correlation with normal physiological processes must first be justified empirically, and it was not yet permissible to argue too freely from observed excretion to diagnosis of physiological condition. R. T. Frank had said that studies of hormone excretion in the menstrual cycle, though they served as valuable aids, could not replace clinical acumen and experience. Dr. Callow hoped that chemists and biochemists might yet be able to improve this position.

Dr. LEVY SIMPSON said that males and females both excreted "male" comb-growth and "female" œstrogenic hormones in about equal quantities. It had occurred to him in 1933 that a virile woman might have an increased excretion of "male" hormone, and in testing this hypothesis he had been lucky enough to choose a woman who did. He had thought that the source of the "male" hormone might be the ovary, adrenals, or pituitary; but he had no knowledge of the pituitary producing such a hormone, and the excretion had been found in an ovariectomised woman. A series of investigations with collaborators, and especially the fundamental work of Callow, supported the hypothesis that the adrenal gland was responsible. If excretion was a measure of secretion, it was hard to see why only some virile women excreted an excess of "male" comb-growth hormone; but it probably was not. Adrenal tumours produced feminism in a male and virilism in a female, the male excreting a considerable excess of œstrogenic hormone and the female a considerable excess of "male" comb-growth hormone; but the histology of the adrenal had hitherto been thought to be the same. At his request, Dr. Joan Ross had compared the histology of the adrenal gland tumours of a virile woman and a feminised man, who had excreted excess of comb-growth and œstrogenic hormones respectively. She found certain discrete granules in the adrenal tumour of the woman, but not in that of the man. This seemed to fit in with her study of normal adrenal glands, in which such granules appeared in the inner zone of the cortex at and after puberty in males, but not till the age of 50 in females. As an alternative to a histological basis for the different secretions, it was possible that the ovary converted an adrenal hormone into one type, the testis into another. If the excretion of comb-growth hormone exceeded 300 units per day, a thorough search for an adrenal tumour must be made, and even laparotomy was justified. Unfortunately, a patient with adrenal hyperplasia might show an excretion up to 300 units, but such high values were uncommon.

Mr. F. LL. WARREN thought the stallion should be remembered as a warning that the type of hormone in the urine was not necessarily an indication of the type of individual. Experiments on mice had shown that ovaries grafted into the ears of castrated male animals could maintain secondary sex growth; there was no inherent difficulty in accepting that one tissue could produce both androgens and œstrogens. He wished that when an adrenal cortical tumour was diagnosed the clinician in charge of the case could be put in touch with those working on these hormones.

Dr. A. C. CROOKE had found that in some cases of virilism there appeared to be some relation between the amount of male hormone excreted and the length of history of amenorrhœa.

Mr. A. S. PARKES, F.R.S., spoke of the relation of waste products to hormones. There was some evidence that all hormones had been excreted at some stage in evolution; for instance, the lactation hormone was present in the pituitary of birds which presumably had no use for it: the waste product of to-day was the hormone of to-morrow.

Dr. A. T. M. WILSON pointed out that the observations recorded lent weight to the view that anatomical and functional sexuality were not identical.

ASSOCIATION OF CLINICAL PATHOLOGISTS

THE eleventh annual scientific meeting of this association was held at St. George's Hospital, London, on Jan. 29th, the chair being taken by Dr. JOHN BOYCOTT.

Blood Fragility Tests

Dr. E. FF. CREED described his technique for estimating the fragility of red blood corpuscles. He found the simplest method of ensuring accuracy in the strength of the sodium chloride solutions was to make up a permanent 25 per cent. stock solution, and prepare dilutions of this when required, using a dropping technique for the final stages. He estimated the amount of hæmolysis at each dilution by matching against colour standards, and plotted the results as a curve. He emphasised the effect of the venosity of the blood on fragility, and showed how this cause of decrepancy could be eliminated by aeration of the blood before testing. He preferred to use fresh untreated blood so as to avoid risk of altering the fragility by any preliminary treatment, and so as to retain the buffering effect of the plasma. He thought that the increased fragility, said to be found in some cases of acholuric jaundice only after washing, was possibly due to increased liability to *p*H changes in the absence of plasma. Dr. Creed also emphasised the importance of taking into account the degree of anæmia when interpreting fragility results, as the corpuscles of anæmic blood show an increased resistance to hypotonic saline. He demonstrated how

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the fragility curve tailed off at each end, and how unsatisfactory was the common form of report, that hæmolysis begins and ends at certain dilutions. He suggested that results should be recorded either as a curve or as the dilutions at which given percentages of corpuscles are hæmolysed. He showed the narrow limits within which fragility curves normally fell and the extreme constancy found in single individuals over long periods.

Dr. R. G. BANNERMAN described a case of hæmolytic anæmia in a man of 60 who gave no family history of anæmia. He complained of muscular weakness and intermittent jaundice. Attempts to make an accurate blood count were frustrated by rapid auto-agglutination in spite of anticoagulants, but estimates of about a million red blood-cells and a high colour-index were made. There was a great excess of reticulocytes. Liver treatment and blood transfusion being ineffective, splenectomy was carried out, but the patient died shortly after.

Dr. C. J. YOUNG drew attention to the fact that splenectomy was not always successful in the treatment of acholuric jaundice. He described a patient with a hæmolytic crisis in whom splenectomy and transfusions failed to arrest the hæmolysis. After the removal of a degenerating ovarian teratoma she completely recovered. It was suggested that the hæmolysis was directly or indirectly related to a toxæmia originating in the ovarian tumour, although this could not be the only factor in its causation. He discussed the position of splenectomy in acholuric jaundice and summarised some of the published evidence that toxæmia was one of the factors in the production of hæmolytic crises. He also pointed out that although splenectomy had been recommended to prevent the occurrence of these crises, it was clear from recorded cases that it could not be guaranteed to do so.

Level of Plasma Bilirubin

Dr. JANET VAUGHAN described observations made in collaboration with Mr. G. A. D. Haslewood on the level of plasma bilirubin in normal and pathological subjects. The values found in 100 healthy men and women, using the method of Haslewood and King (1937), had varied between 0·2 and 1·7 mg. per 100 c.cm., 93 per cent. of the figures falling between 0·2 and 0·8 mg. The high figures had been all present in men. She concluded that there was no justification in excluding such figures as previous workers had done and suggested that until further work was available levels varying between 0·0 and 1·3 mg. per 100 c.cm. should be considered as probably normal, while figures between 1·3 and 1·7 mg. should be regarded as probably, but not necessarily, pathological. In 15 cases of typical Addisonian pernicious anæmia with red cell counts below 3,500,000 per c.mm. only 3 had been found to have a plasma bilirubin above 1·1 mg. per 100 c.cm.; the average figure being 0·93 mg.—well within normal limits. She suggested that this divergence from accepted teaching was due to the fact that patients with Addisonian pernicious anæmia now received treatment in an early stage of the disease before unutilised pigment had time to accumulate. She believed that there was no essential difference in pigment metabolism between Addisonian pernicious anæmia and other megalocytic hyperchromic anæmias reacting to liver, as had previously been believed. In 9 examples of hypochromic anæmias in middle-aged women she had found an average plasma bilirubin of 0·15 mg. per 100 c.cm. with a range of 0–13·0 mg. In 7 patients with acholuric jaundice before splenectomy the range had been 0·7–2·3 mg. per 100 c.cm. After splenectomy it always became normal. Dr. Vaughan suggested in conclusion that the level of plasma bilirubin was not necessarily a true indicator of the character of metabolism of blood pigment, just as the level of serum calcium was not always a true indicator of the normality of calcium metabolism.

Hypochromic Anæmia in Infancy

Dr. H. W. FULLERTON discussed the rôle of maternal iron deficiency in the ætiology of the hypochromic anæmia of infancy. Analysis of the hæmoglobin levels of 167 mothers and their infants, aged 9–16 months, revealed no significant correlation between maternal anæmia and anæmia in the offspring. The finding, therefore, did not support the view generally held, that the infants of mothers suffering from iron deficiency have a normal hæmoglobin level at birth but develop hypochromic anæmia towards the end of the first year of life owing to deficiency in iron stores in the liver at birth. A quantitative study revealed that even complete absence of liver stores of iron at birth could produce only a mild degree of anæmia in the infant after nine months. It was concluded that low birth weight was a much more important factor in the development of hypochromic anæmia in infancy.

Obscure Macrocytic Anæmia

Dr. FULLERTON also described 3 cases of severe macrocytic anæmia. In the first case the anæmia was associated with portal cirrhosis of the liver and showed a partial response to parenteral liver extract therapy. He concluded that, since many cases do not respond to liver extract therapy, the macrocytosis could not be attributed solely to a lack of storage of the anti-anæmic factor in the diseased liver. A depressant effect on the bone-marrow of toxic products formed or retained as a result of liver failure was considered to be a possible cause of the macrocytic anæmia. It was suggested that in those cases in which there was partial response to parenteral liver therapy there might also be deficiency of the anti-anæmic factor, due either to a failure in production of "intrinsic factor" resulting from the gastro-enteritis which frequently precedes and accompanies liver cirrhosis, or to a failure in absorption of the anti-anæmic factor consequent on congestion in the portal circulation. In the second case there was chronic nephritis with nitrogen retention. It was suggested that severe macrocytic anæmia secondary to renal insufficiency may occur, although the common type of anæmia is normocytic. The value of sternal puncture in the differential diagnosis of rare types of anæmia was stressed. In the third case the outstanding features were a persistent reticulocytosis, severe macrocytic anæmia that did not respond to intensive treatment, and splenectomy and absence of increased hæmolysis. It was concluded that the anæmia was to be explained by aplasia of the bone-marrow, in which, however, there persisted small foci of erythropoiesis that became hyperplastic.

Dr. N. HAMILTON FAIRLEY stated that though in the deficiency anæmias the reticulocyte response to replacement therapy had been carefully studied, little had been done in the anæmias caused by bacteria and parasites. Tropical diseases afforded scope for such investigation. In malaria, after experimental infection, a hæmolytic normocytic anæmia rapidly developed. After Atebrin or quinine administration the temperature became normal and parasites disappeared from the peripheral blood; in 6–9 days a maximal reticulocytosis ensued, associated with blood regeneration. A fall from 5,500,000 to

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4,000,000 erythrocytes per c.mm. might be followed by a maximal reticulocytosis of 8–9 per cent. In chronic malaria also the reticulocytosis was inversely related to the red cell count; here the red marrow was already hypertrophied and the reticulocytes somewhat increased before treatment had started. In blackwater fever an intense reticulocytosis followed intravascular hæmolysis. Anoxæmia consequent on blood destruction was the main factor involved. In amœbic liver abscess associated with mild degrees of anæmia, emetine injections were followed by disappearance of fever and a maximal reticulocytosis some 7–10 days later. Where there was secondary coccal infection such effects were not noted. Here a reticulocytosis persisted for many weeks, only disappearing with recovery. It appeared that malaria and amœbic parasites inhibited erythroblastic response in both these diseases, acting either directly on the normoblast and thus preventing adequate reticulocyte formation, or indirectly by decreasing the availability of factors essential to normal hæmopoiesis. Graphs showing the reticulocyte response in tropical sprue to oral liver extract and Campolon therapy were demonstrated, also the submaximal response and poor blood regeneration following Marmite and Ventriculin, neither of which proved satisfactory. The more refined and concentrated liver preparations—anahæmin (Dakin and West fraction) and reticulogen (Cohn fraction)—gave lower maximal responses and had to be given in relatively much larger dosage than in Addisonian anæmia to be effective.

Blood Tests in Disputed Paternity

Dr. JOHN C. THOMAS read a paper on the blood-grouping test in disputed paternity. After discussing the results of the test in nearly 10,000 cases abroad, he showed that if the test was routinely used in England approximately 1000 men yearly who are involved in affiliation suits would be proved not to be the guilty party. In view of impending legislation it was necessary to standardise the technique of the test to ensure accurate and comparable results. He emphasised the absolute necessity of complete control tests to ensure both specificity and potency of the sera, especially with anti-A and the immune anti-M and N sera, which if purchased through a commercial house were often contaminated and non-specific. The sera must be of known high titre and should be titrated at intervals. They should not be stored in capillary tubes. Weak sera often fail to detect the A2 agglutinogen especially in group A2B, and anti-N sera may be so weak as not to react with MN groups, and often fail to react with the N2 factor. The use of a too strong cell suspension is often a source of error and none stronger than 1 per cent. should be used. The test should never be done at a temperature lower than 20° C., and may be done in tubes or on slides, this being a matter of individual preference; titrations must always be done in tubes. In either method a negative reading must only be made after microscopical examination. If completely typical reactions are not obtained with the unknown and all the control cells the test must be repeated with fresh sera of which at least three of each type should be available. The cells should be tested always with two or three anti-M and anti-N sera. In all forensic blood groupings the serum agglutinins must always be examined as a check on the cell tests, and this should preferably be done by titration. When there is a reciprocal relationship between the cell and serum tests, and only then, is one justified in taking the results into a court of law.

A number of outfits for the transmission of pathological specimens through the post were displayed for inspection. These all complied with the Post Office regulations and had received official approval.

MEDICAL SOCIETY OF LONDON

AT a meeting of this society on Feb. 14th, with Mr. J. E. H. ROBERTS, the president, in the chair, a discussion on the results that can be expected of

Deep X Ray Therapy

was opened by Dr. J. H. DOUGLAS WEBSTER. He said that the results of X ray treatment depended upon many factors, including the site of the lesion, the stage of the disease, and the state of the patient. Ewing had said that the best chance for radiotherapy was an active growth in an active patient. Another important factor was the quantity and quality of the dosage, and the time intervals over which it was given. The effect of minimal doses was clearly seen in so-called "stimulation" therapy. It was orthodox to say that X rays had no stimulating effect, but he saw grounds for believing that they had an action somewhat similar to alcohol and other drugs which produced first a depressant and afterwards and indirectly a stimulating effect. A number of surgeons habitually sent patients for a small irradiation of the spleen before a gall-bladder operation in order to improve the coagulation time and increase the output of platelets. Small doses applied to the ovaries and pituitary gave good results in obstinate amenorrhœa and sterility. Stimulation of the bone-marrow with doses of about 1/20th of an erythema dose had been of value in agranulocytic angina—perhaps by a mechanism analogous to that which benefited patients with pernicious anæmia by inducing a greater production of red cells.

Deep therapy was also useful in the treatment of infective and inflammatory conditions. He had seen prompt response to small doses of X rays in cases of acute furunculosis of the face; and instances of the successful treatment of carbuncles could be found in the literature. Carbuncles associated with advanced diabetes did not, however, respond well. Many clinics in America had been treating rhinitis, nasal sinusitis, and acute mastoiditis by X rays, and rapid response had been reported in the great majority of a series of infants. X ray treatment was worth trying in inflammation of the tonsils, especially where operation was undesirable, as in a singer, and where the condition was severe and extended to a ring of adenoids, as in a child. Various types of endocarditis had been treated, especially in New York, by doses of about 1/10th of an erythema dose to the heart, and many patients had fared better than they would have under medical treatment. Another field in which X ray therapy held out promise was that of the glandular hyperplasias and functional over-activities, such as conditions of benign hypertrophy of the prostate, exophthalmic goitre, and over-activity and lesion of the anterior lobe of the pituitary. Prostatic enlargement was one of the conditions in which he had received most thanks from patients after treatment by X rays, and marked improvement in nocturnal frequency, residual urine, and other symptoms in more than half the patients treated was recorded in the literature. The pituitary gland was an especially suitable field for X ray therapy in that alternative treatments were so few. Good results were not infrequently seen in Cushing's basophil syndrome as well as in acromegaly. Several cases of Addison's disease had benefited greatly from

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"teleroentgen" therapy—the irradiation of large surfaces of the body at a distance of one or two metres. One patient had lost her pigmentation and her blood pressure had returned to normal. Distant therapy had also been used in Malta fever and scleroderma.

X rays acted as a desensitiser in many allergic conditions—e.g., asthma, generalised psoriasis, pruritus, and eczema. They were almost the only possible treatment in rare blood conditions like lymphatic leukæmia and polycythæmia. Some authorities used distant therapy from the beginning, but Dr. Webster considered that better results were probably to be expected by treating the spleen and glands locally at first and holding distant therapy in reserve in case of a relapse. Hodgkin's disease could be treated by either method.

In the treatment of malignant disease the use of X ray therapy had been more often discussed and more clearly defined. Operation was the method of choice in operable cancer of the gastro-intestinal tract and gall-bladder and probably also of the kidney, though pre-operative irradiation might be desirable, especially in children. The same rule applied to carcinoma of the bladder. Surgery was also better for carcinoma of the body of the uterus and sarcoma of bone, but cancer of the skin, lip, cervix, mouth, pharynx, larynx, penis and testis, and Ewing's and one or two other sarcomata, especially of soft parts and glands, were better treated by X rays. In conclusion, he did not believe that anything would be gained by pushing up the voltage of the X ray generator. He quoted Stone of California in support of the view that the results of high-voltage X ray therapy had not excelled those of ordinary deep therapy at 200–250 kv. Advances were more likely to be obtained by a better arrangement of the time factor, such as the saturation method, the protracted fractional method, and Holfelder's decrescendo method.

He showed a table indicating that recurrences of many kinds of malignant growth took place regularly at an interval of eight or, less commonly, four lunar months. The onset of the recurrence could thus be predicted and treatment could be applied in its earliest stage, so that the percentage of recovery was increased four times.

Dr. W. M. LEVITT, confining himself to malignant disease, said that by the criterion of total disappearance of clinical disease over a period of years, certain varieties of cancer could undoubtedly be cured by X ray treatment. The concept of the radiosensitivity of a tumour was sufficiently precise to the radiotherapist accustomed to accurate and consistent dosage: it implied the vulnerability of the growth cells in relation to that of the normal tissues cells—the margin of safety over the lethal dose for the growth. Certain tumours were very radiosensitive, others were moderately so, and a third class were very resistant. Not all or even the majority of radiosensitive carcinomas were curable, and metastases accounted for the bulk of the failures. The site of origin was often more important than the type of the growth. Rapidly growing tumours were more likely to be sensitive, but slowly growing tumours were not necessarily resistant. Accessible growths were usually more amenable to treatment: skin cancers were easily treated but a growth in the middle of the œsophagus presented a serious undertaking.

Success could only be hoped for in a comparatively small proportion of all cases, and selection was therefore very important. Palliative treatment fell into two classes, one in which radiation was applied for the relief of an urgent pressure symptom—e.g., from a growth in the glands of the œsophagus or trachea; and the other for the prolongation of the patient's life and his return to work. If secondary deposits in bone were the only indication in X ray therapy, its success in their treatment would alone justify the work and expense applied to it to-day. Its disadvantages included the discomfort and suffering it caused, and these varied with the situation and type of the growth. They were usually negligible in the treatment of superficial growths, and at their worst in the treatment of growths in the mouth and throat, for it produced soreness of the skin and throat, dryness of the mouth, and loss of taste and appetite. Only palliation for some years could justify X ray treatment in these conditions. The reaction to treatment of the prostate and bladder was severe, but carcinoma of the prostate was worth treating in an otherwise favourable case. Blood changes were unimportant in the vast majority of cases, but might be considerable after the irradiation of very wide fields, which was therefore only justified in widespread disease. Malignant changes could not be produced by any modern application of X rays.

Dr. G. E. VILVANDRÉ said that good results had been obtained in lymphadenoma before the introduction of deep therapy. Hodgkin's disease was not cured by X rays, though life might be prolonged and dyspnœa relieved. Good results followed treatment of tuberculous glands of the neck if they were not caseous. X ray therapy would reduce an enlarged spleen but would not cure myelogenous leukæmia, though it would make the patient comfortable and reduce the white blood-cells to 50,000. Really effective results could be obtained in osteo-arthritis, joint function being restored and pain allayed. The radiologist could tell after a few doses whether the patient would benefit. The radiographic appearance of the joint was, however, not changed. The lesions of actinomycosis were healed, the sinuses would dry up, and the masses shrink. Some large mediastinal and retroperitoneal tumours disappeared after a course of irradiation, and he was convinced of the advisability of deep therapy for thoracic sarcoma if diagnosis had been early. His results had not been good in carcinoma of the bronchus, but real success often followed irradiation for carcinoma of the thyroid, and in some instances he would seriously consider giving deep therapy priority over surgery. On the other hand, X ray therapy of hard carcinomatous glands of the neck never gave satisfactory results.

Sir JAMES WALTON confessed that, as a surgeon, he had not given the radiologist a fair deal, for—at the beginning at least—he had only sent him the bad risks and relapsed cases. Even so, the results were quite good enough to show the real value of X rays in malignant disease, and he predicted that the younger members of the society would live to see the day when operation for carcinoma of the breast and thyroid would be considered absolutely unjustifiable.

The PRESIDENT bore witness to the good results obtained in the last few years by treatment of carcinoma of the bronchus with X rays. He suspected, however, that it might in some cases precipitate metastasis. An eminent pathologist had suggested to him that when large quantities of malignant cells were destroyed they became liquefied by autolysis; the liquid passed away through the lymphatic vessels and might carry with it a number of living cells. If this were true, it would provide an argument for the surgical removal of the primary growth wherever possible. X ray therapy was scientific enough on the mechanical side but essentially empirical on the clinical side.

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Mr. WILLIAM IBBOTSON asked whether the association of active syphilis with a malignant growth prejudiced the result of the treatment.

Sir WILLIAM WILLCOX mentioned the value of X ray therapy in persistent sciatica and brachial neuritis, and asked how the radiation acted in these inflammatory conditions. He also spoke of good results in the removal of keloids.

Dr. WEBSTER, in reply, suggested that autolysed cells would pass into the lymphatic cells whether the patient was treated or not, so he would not be the worse off for treatment in this respect. If the normal defence of the body against malignant disease was situated in the reticulo-endothelial system, radiation presumably acted by stimulating that system. In one case he had thought that syphilis had hindered the effect of irradiation. Palliation of joint conditions might be due to reduction of inflammatory exudations and consequently of pressure upon nerves.

Dr. LEVITT, also in reply, said that the breast should always be removed, for the growth nearly always recurred. The rapid spread of a growth seemed to be bound up with its radiosensitivity, and he could not say whether X ray treatment favoured metastasis or not. He had never found that syphilis introduced either risk or obstacle. The body's reaction to irradiation was identical with its reaction to bacterial invasion: it poured out non-specific antibodies into the treated area and produced an active inflammation.

Dr. VILVANDRÉ also replied.

CARDIFF MEDICAL SOCIETY

A MEETING of this society was held in the Welsh National School of Medicine on Feb. 8th, with Dr. C. W. SHEPHERD, the president, in the chair. A discussion on the

Return to Work of the Injured Colliery Workman

was introduced by Mr. A. W. SHEEN, F.R.C.S. He said the defects in the present arrangements for treating the injured workman were due not to the doctor but to circumstances. He suggested a scheme for treatment in the best possible circumstances from the very first, which should be continued until the workman was restored to as full health as possible. The most valuable first-aid measures were the dressing to be carried by the workman and an ambulance squad formed by the men, so that as much as possible could be done on the spot. It was desirable to have a resting place for the seriously injured in the coal-pit itself, to obviate moving them too hastily. There should also be a casualty clearing station near by, suitably equipped and staffed, with a doctor present, where any further necessary treatment could be carried out and the disposal of the patient determined. The most important part of the scheme was an industrial accident hospital. Mr. Sheen visualised one of 200 beds, suitably equipped and staffed, and broadly constituted on the model of a war orthopædic hospital. The home doctors would be associate members of the staff. It would be a great advantage to group patients according to their disability. There would be amusements and sports, general physical training, vocational training for those not fit for their former work, and rehabilitation in what would be almost a miniature colliery, with coal-face, tools, &c. Restoration of function would be aimed at from the first. The atmosphere of the hospital would be made attractive in every way to the patients, while neurasthenic and allied conditions would be carefully treated. While not every injured workman would be admitted to hospital, he gave a warning of the possible serious consequences of apparently trivial injuries—those of the hand for example often needed in-patient treatment. The services of the hospital medical team should be available for all accidents: there were many other injuries besides fractured limbs. The scheme was analogous to the methods established by Sir Robert Jones during the late war, whose success had resulted in so few war cripples being found to-day. He considered that money would be saved by the adoption of these measures and suggested contributions from the employers, from the Miners' Welfare Fund, and from other sources.

Mr. IESTYN WILLIAMS, joint secretary of the Monmouthshire and South Wales Coal Owners' Association, said that both employers and employed were united in their desire that the best possible conditions should prevail within the industry. The cost of any scheme, however, could not be divorced from its effects upon the industry in other directions. Added costs would have grave effects on industry at a time when it could not pay the minimum wages provided in the industrial agreement. Even if it were able to exceed this minimum, 85 per cent. of any additional cost would be borne by the workmen.

Mr. ARTHUR HORNER, president of the South Wales Miners' Federation, referred to a paper he had noticed in THE LANCET of 1832, and said he did not think that the handling of certain industrial disabilities had advanced much since that date. He advocated the presence of doctors in the pits; he thought that small accidents were treated too lightly and objected to the "more than three days" classification of accidents. He did not think that the cost of the scheme was prohibitive; he suggested the Nuffield Trust and Special Areas Fund as possible benefactors. It was essential that the injured workman should be assured of his employment when he had recovered.

Dr. H. G. COOK, commending the scheme, said that thirty years ago in a paper read to the Insurance Institute of Cardiff he had recommended a special hospital and even indicated its possible location. Employers and the insurance companies to-day were apathetic and the latter were content to take the insurance premiums. He also condemned the apathy of workmen's organisations, saying they were more concerned with getting the largest "compensation" and the largest "lump sum" than with the betterment of the men's conditions.

Mr. NATHAN ROCYN-JONES said that it was important that more "light work" should be available and of there being physiotherapeutic centres in the coal valleys.—Mr. EVAN WILLIAMS, compensation secretary of the South Wales Miners' Federation, also urged that injured workmen when partially recovered should be given suitable light work. He thought that medical students ought to be specially taught industrial medicine.

Prof. DAVID JONES, professor of mining in University College, Cardiff, explained the difference between "reportable" and "non-reportable" accidents. He stressed the importance of having good fracture clinics. He admired the work done by medical men in the coal-field, particularly in relation to explosions.

The PRESIDENT said he recognised the difficulties in the present treatment arrangements and he alluded to the scheme of a union of 30 panels, a central hospital, and doctors practising different specialties.

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REVIEWS AND NOTICES OF BOOKS

La chirurgie de la douleur

By R. LERICHE, Professor of Clinical Surgery in the Faculty of Medicine, Strasbourg. Paris: Masson et Cie. 1937. Pp. 428. Fr.65.

THIS volume contains a series of clinical lectures on the surgical treatment of pain, and gives in Leriche's vivid style an account of his wide experience in this field. He and his associates have earned for themselves a world-wide reputation for relieving pain in the viscera and in the limbs by excision of various portions of the sympathetic nervous system, and these clinical triumphs are now reviewed and explained in the light of the physiology of François Franck. His success is not in doubt; but his explanation of it will sound unconvincing to those who have been brought up to believe that pain impulses do not travel along sympathetic nerves. With the exception of trigeminal neuralgia, all the other forms of pain with which he deals—causalgia, painful amputation stumps, Raynaud's disease and arteritis, angina pectoris, and pelvic visceral pain—are considered to have their origin in and to be conducted by the sympathetic system, though no clear idea is given of the adequate stimuli or the receptor organs initiating the impulses which give rise to pain and reflexly produced various objective phenomena. The observation that many of these pains may be abolished temporarily by injecting a local anæsthetic around the sympathetic ganglia, and permanently by excising the ganglia, is something for which surgeons owe Leriche a great debt of gratitude, but it cannot be accepted as proof of his theories.

The title of the book does not indicate its limited scope, for the pains curable by sympathectomy, though obscure in their nature and fascinating to the investigator, are comparatively rare, and this book does not help in the treatment of intractable pain due to the involvement of spinal nerves by disease. But it gives much food for thought and may well provide the stimulus to further neurological research—even, it may be, with the laudable object of refuting some of the theories upon which Prof. Leriche has based his practice.

Neuro-Ophthalmology

By R. LINDSAY REA, B.Sc., M.D., M.Ch., F.R.C.S., Ophthalmic Surgeon to West End Hospital for Nervous Diseases; Surgeon to the Western Ophthalmic Hospital; Ophthalmic Surgeon to the British Hospital for Mental Disorders and Nervous Diseases. London: William Heinemann (Medical Books). 1938. Pp. 568. 42s.

THE attitudes of the ophthalmologist and neurologist to neuro-ophthalmology are very different. The ophthalmologist is mainly concerned to recognise those ocular manifestations which fall outside the scope of his treatment so that he may refer the patient to the appropriate specialist. If he is ophthalmic surgeon to a neurological hospital he develops a more specialised interest in the neurological aspect of ophthalmology. His angle of approach to the subject, however, must necessarily be different from that of the neurologist, who sees in the ocular symptoms of nervous disorders merely special examples of disorders of function and pathological processes which are constantly occupying his attention in other parts of the nervous system. The ophthalmologist who sets out to write a text-book on neuro-ophthalmology, however keen his interests and wide his experience, can hardly fail to be handicapped by the lack of that clinical background which the neurologist possesses. When he comes to relating ocular disturbances to general neurology he has to fall back upon descriptions written by other authors, and in these circumstances it is difficult to preserve balance and proportion. Ideally a text-book on neuro-ophthalmology should be written by an ophthalmologist and a neurologist jointly.

In spite of these handicaps Mr. Lindsay Rea has written a valuable and informative book. It is encyclopædic in its scope and there can be few conditions of common interest to the ophthalmologist and the neurologist which are not described, or at least alluded to. It suffers, however, from lack of planning and the pages of contents somewhat resemble an encyclopædia which has undergone a derangement of its alphabetical order. Thus, in chapter 10, which is headed "Abnormalities: Congenital and Degenerative. Subarachnoid Hæmorrhage," chorea and oxycephaly are strangely juxtaposed, while other odd bedfellows are Little's disease, otitic hydrocephalus, and fractures of the base of the skull. It is not at first sight easy to see why encephalitis lethargica should be included in chapter 9, "Localising Value of Ocular Symptoms in the Diagnosis of Diseases of the Brain," rather than in chapter 13, "Ocular Manifestations in Diseases of the Nervous System." Cerebro-spinal meningitis appears twice, first in chapter 9 and later, rather oddly, in chapter 16 which deals with "Poisons which Affect Vision."

The book has been excellently produced and is lavishly illustrated. Misprints are rather numerous, and in the next edition perhaps we may be spared "parkinsonianism." The book concludes with forty pages of references and an adequate index. It will undoubtedly find a place as a work of reference for those who wish to obtain the latest information, more particularly about the rarer diseases common to the eye and nervous system.

A Manual of Operating Room Procedures

By ALMIRA W. HOPPE, Science Instructor, Jewish Hospital of St. Louis; and LUCILLE M. HALVERSON, Supervisor of Operating Rooms, University of Minnesota Hospitals. Minneapolis: University of Minnesota Press; London: Humphrey Milford, Oxford University Press. 1937. Pp. 239. 9s.

THIS book has been prepared as a guide for the nursing staff in the operating theatre unit, and is to them what an abridged text-book of operation technique is to the surgeon. Every possible aspect of theatre work, the routine of the staff, the preparation and the sterilisation of instruments, gloves, and suture materials, the "set" required for all operations from the insertion of radon to laparotomy, is dealt with. In the last five chapters is given a brief synopsis of the main steps of every operation, allowing the nurse from her place at the instrument table to follow what is being done by the operating team. The information is clearly arranged in tabular form, so that the requirements for any particular purpose can be taken in at a glance. The pages lie flat, and the cover is made to survive a good deal of maltreatment and wetting.

It is perhaps inevitable that the requirements as set out should be those of a particular university, and that the names of needles and of many of the common instruments should be those more familiar to American

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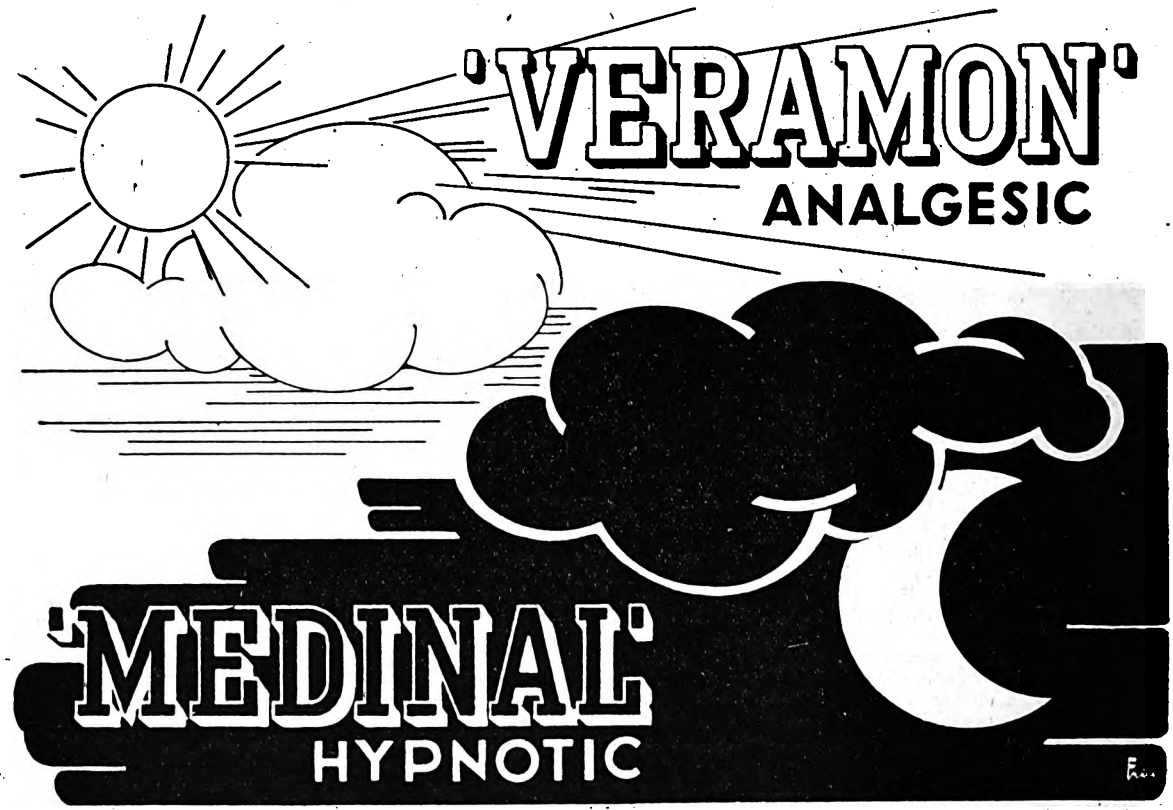

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THE LANCET

LONDON: SATURDAY, FEBRUARY 19, 1938

THE CROYDON EPIDEMIC

THE outbreak of typhoid fever at Croydon last October and November has already led to the illness of 310 persons, of whom 43 have died. The cause is now established beyond doubt, and it is a cause that ought to have been prevented. Mr. HAROLD MURPHY, K.C., appointed by the Minister of Health to inquire into the outbreak, attributes it to the infection of a fifty-year-old chalk well at Addington. His medical and engineering assessors substantially concur. Three factors, he says, coincided: there was constructional work in the well; one of the workmen was a typhoid carrier; and chlorination was omitted. Dr. HOLDEN, the medical officer of health, never knew that work was going on in the well. He was never told that, while the work was proceeding, there would be no chlorination. Mr. BOAST, the borough engineer, responsible for the water-supply, was in ignorance too. Mr. BRANDRAM-JONES, the assistant water engineer, overestimated the value of the filtration plant and underestimated that of the chlorinator.

If the borough engineer failed to keep the medical officer of health informed of vitally important points, he himself was unaware that typhoid was being reported. The first case was notified on Oct. 27th, the second on Oct. 28th, and two more on Oct. 30th; the borough engineer learnt for the first time on Oct. 31st—and then by a telephone message from an unofficial source—that there was any typhoid in the borough. On Nov. 1st the medical officer of health told all the local doctors that typhoid had appeared in South Croydon. He gave no details however. Medical practitioners would have been greatly assisted in the task of diagnosis if they had known that water had been identified as the source of the disease. But no such identification had taken place. Dr. HOLDEN was disinclined to suspect water until he had eliminated other factors. The last substantial outbreak of typhoid fever had been traced to milk. The evidence given by Dr. SUCKLING at the inquiry seems to have convinced Mr. MURPHY that water should be immediately suspected and that, if there is any priority in the course of searching for possible causes, water should have the first place. "I think," said Dr. SUCKLING, "that water occupies the pre-eminent position with regard to the spread of typhoid fever . . . my view is that the majority of the epidemics of typhoid fever have been due to the infection of water rather than food." This delay—Mr. MURPHY calls it only a slight delay—in realising that water was or might be the cause of the epidemic is happily the sole criticism of Dr. HOLDEN which Mr. MURPHY regards as legitimate. The medical officer of health is described as a loyal, able, and industrious servant of the Croydon corporation, as well as a truthful and careful witness. His work in arranging for the treatment of the patients throughout the epidemic is highly praised.

The details of Mr. MURPHY'S report appear upon another page. The lessons are obvious. Men who work in wells must be physically fit. Mr. MURPHY does not insist that, as a preliminary, bacteriological tests should be made of fæces and urine, but he regards a Widal blood test as a not unreasonable precaution. The provision for the workmen at the Addington well to relieve themselves was highly dangerous. The use of an ordinary stable bucket for urine and the arrangements for it to be pulled to the surface speak for themselves. So careless was the supervision that workmen were allowed to dig and use a latrine almost directly above one of the well adits. Apart from the obvious sanitary precautions, there is the outstanding need of coördination between the medical officer of health and the borough engineer. Dr. HOLDEN and Mr. BOAST worked under the same roof. If the former had been told what was going on at the well, his advice would have been promptly given and the outbreak might have been averted. Dr. HOLDEN had apparently no facilities for knowing that the patients were all supplied with water from the same source. Sir WILLIAM WILLCOX, who gave evidence at the inquiry, stated that in all large areas there should be a committee which would represent the local doctors, so that in emergency there might be constant contact with the medical officer of health and so that information of symptoms and possible causes might be promptly exchanged. Not less important, it seems, is the clear determination of responsibility for water-supply. If a borough engineer has too many other concerns to be able to attend to what is perhaps the foremost object of public health, some other arrangement must be made for ensuring that the supply of pure water is under expert supervision. Lastly, the time may now have arrived for raising the question whether the medical officer of health is armed with all the powers which the nature of his duties may require.

THE STOMACH AND PERNICIOUS ANÆMIA

A RELATIONSHIP between pernicious anæmia and lesions of the stomach was recognised by FENWICK in 1880 when he described gastric atrophy in patients dying of the disease. Evidence of a functional deficit in gastric secretion was brought forward by W. B. CASTLE and his colleagues some fifty years later, in 1929. They showed that the stomachs of patients with pernicious anæmia were unable to secrete a substance they called "the intrinsic factor," which normally reacts with an "extrinsic factor" present in ingested food. In the normal person the two factors between them produce the precursor of the "pernicious-anæmia principle," which is stored in (and obtained from) liver, and MINOT and MURPHY had already proved

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that lack of this principle leads to the development of the disease. Further elaborate experiments by E. MEULENGRACHT in 1935 demonstrated that, in the pig's stomach at least, intrinsic factor is secreted by the pyloric glands of the stomach and by Brunner's glands of the duodenum. This observation was in every way satisfactory, because it explained why pernicious anæmia does not always follow complete gastrectomy; for in such cases intrinsic factor could still be secreted by the first part of the duodenum.

At this time therefore we had a neat picture of the relation of the stomach to pernicious anæmia: the disease, it appeared, results from deficiency of the pernicious-anæmia principle in the liver, which is due in turn to failure on the part of the pyloric glands and Brunner's glands to secrete intrinsic factor. This failure was thought by many people to be due to a long-standing gastritis. Since 1935, however, certain rather disconcerting observations have been made, some of which are recorded elsewhere in our present issue. Dr. MAGNUS and Dr. UNGLEY describe there a careful histological study of the stomachs of seven patients with pernicious anæmia who died during a relapse. In all of them a characteristic lesion was found, localised to the mucosa of the body of the stomach and not affecting the pyloroduodenal region. That is to say, the only region that appeared normal was the one which, according to 1935 knowledge, should have been abnormal. Further, the lesion affected all coats of the stomach wall, including the muscle, and did not resemble in any way the result of an inflammatory process. A preceding gastritis could therefore not be regarded as a factor in its production. MEULENGRACHT himself has reported similar findings, and numerous gastroscopic examinations of patients with pernicious anæmia confirm the observation that the pyloric mucosa is not atrophic.

Nothing is definitely known about the cause of this peculiar gastric lesion. MAGNUS and UNGLEY suggest that it is possibly the end-result of some endocrine or nutritional deficiency, and information is certainly accumulating to suggest a relationship between the pituitary gland and hæmopoiesis, possibly through the gastric mucosa. The work of DODDS and his associates[1] at the Middlesex Hospital incriminates the posterior lobe, since they found that massive doses of posterior pituitary extract given to rabbits produced ulceration of the gastric mucosa, and hyperchromic anæmia. On the other hand SNAPPER and GROEN, in collaboration with HUNTER and WITTS,[2] after studying cases with achlorhydria, anæmia, and subacute combined degeneration associated with pituitary and gonadal insufficiency, suspect disorder of the anterior lobe. It is clear that though we can now treat pernicious anæmia with success and know something of the way in which it develops, the more fundamental ætiology of the disease has still to be ascertained.

[1] See *Lancet*, 1937, 2, 698.

[2] Snapper, I., Groen, J., Hunter, D., and Witts, L. J., *Quart. J. Med.* 1937, 6, 195.

FOOD AND THE GROWING FAMILY

IN recent reports on nutrition[1] particular emphasis is laid upon the requirements of children. An adequate and well-balanced diet is held to be more important at this stage of life than at any other, for it is needed to ensure a proper rate of growth, a maximum resistance to disease and ill health, and thus the development, so far as nutrition is concerned, of a healthy adult generation. In the absence of a system of family allowances, however, it must be difficult, and often impossible, for the poorer sections of the population to provide the diet that the nutritionists regard as desirable. In other words, the family diet will probably be unsatisfactory just at the period when it is most important for it to be satisfactory. How far lack of money does in fact have this result is discussed by Dr. FRASER BROCKINGTON in a valuable paper[2] based on his observations in West Sussex.

BROCKINGTON has examined the weekly budgets of 80 rural and 97 urban families and has analysed them in terms of total income and of expenditure on food per "man-value." As a standard against which to assess these families he takes a diet from the report of the British Medical Association's committee on nutrition. The cost of this at 1936–37 prices would be 7*s*. 8¾*d*. per "man," and it is noteworthy that this is very close to the amount that the housewives in his sample actually seem to aim at spending when income allows. Since, however, the B.M.A. diet has been criticised as over-generous BROCKINGTON takes a second standard with only 2400 calories and 37 grammes of first-class protein at a cost of 5*s*. 10¾*d*. Upon the first standard about 51 per cent. of the children in the urban families fall below sufficiency of total food and 45 per cent. of first-class protein; upon the second standard the figures are about 20 and 21 per cent. With the rural group the figures are still worse, for 72 per cent. of children fall below the first standard and 40 per cent. below the second. Accepting 2*s*. per man-value per week as a conservative estimate of the minimum expenditure on first-class proteins, some 13 per cent. of the urban children and 33 per cent. of the rural were subsisting on amounts suggesting serious deficiency.

The urban group of families can be further divided into three groups: "entrant" with a child not more than seven years old at school; "leaving" with one or more children earning over 10*s*. weekly; and "middle" with several children of school age. The percentages assessed as deficient in these three groups are 5, 45, and 51 on the higher standard, 0, 7, and 26 on the lower standard. If the "middle" group is subdivided by number of children the deficiency increases steeply with the growth of the family, and where there are more than two children nearly

[1] For example, the first report of the Ministry of Health's advisory committee on nutrition and the publications of the Health Organisation of the League of Nations.

[2] *J. Hyg., Camb.* January, 1938, p. 40.

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half the families fall into the zone of "marked protein deficiency." The rural group gives very similar results. There is the same steady decline in food provision as the family grows, and where the wage is below 40*s.* it seems to become insufficient after the birth of the first child. Most significant again is the decline in the provision of first-class protein foods as the family grows. With medium wage-earners the allowance for food of 9*s.*–11*s.* per unit per week when the family is small is reduced to about 3*s.* when the family reaches a large size and before the first children begin to earn. This situation—precisely the reverse of what is desirable—has of course been recognised and has led to the milk-in-schools scheme and the provision of meals free or at reduced cost for the children of necessitous families. BROCKINGTON'S study suggests that it needs wider recognition and more provision to remedy it. Such financial deficiencies have an obvious bearing on the reduced size of family which the population experts deplore.

EXOPHTHALMOS AND THE PITUITARY

EXOPHTHALMOS has always been the most puzzling symptom of Graves's disease, and many explanations of it have been proposed. It has been attributed to contraction of the smooth muscle of the orbit in response to over-activity of the sympathetic, to dilatation of the orbital blood-vessels, to increase in the volume of the retro-ocular fat, to œdema of the orbital contents, and to relaxation of the extra-ocular muscles. During recent years two separate but converging lines of approach have brought us much nearer to a solution of the problem. The association of external ophthalmoplegia with conspicuous exophthalmos in patients presenting general symptoms of hyperthyroidism has been known for many years, and a good deal of attention lately has been devoted to this syndrome. In the United States several workers have reported cases of progressive exophthalmos, accompanied by ophthalmoplegia, arising after thyroidectomy performed for hyperthyroidism. The histology of the orbital contents in this condition has been studied and there is general agreement that the external ocular muscles are greatly enlarged owing to œdema and show foci of lymphocytic infiltration. The orbital fat is œdematous and there may be papillœdema. RUSSELL BRAIN [1] has pointed out that since this syndrome may occur either spontaneously in association with hyperthyroidism, or post-operatively in the presence of myxœdema, the exophthalmos and ophthalmoplegia can hardly be attributed to thyroxine, which moreover very rarely produces exophthalmos when administered even in large doses either to man or to animals.

For several years it has been known that the anterior lobe of the pituitary secretes a hormone, the thyrotropic hormone, which when injected into animals temporarily evokes all the symptoms of Graves's disease, including exophthalmos. It has also been shown that this hormone will cause exophthalmos even more readily in thyroidectomised than in intact animals. Post-thyroidectomy exophthalmos in man is thus paralleled by post-thyroidectomy exophthalmos produced by the administration of the thyrotropic hormone of the pituitary in animals. Is the unknown factor responsible for the exophthalmos in man the thyrotropic hormone of the pituitary? This question cannot be answered at present, but a piece of evidence which points suggestively in this direction has just been published by SMELSER.[2] Hitherto there has been no histological study of the orbital contents in exophthalmos experimentally induced in animals by means of the thyrotropic hormone. SMELSER has administered this hormone to 50 guinea-pigs, which were previously subjected to thyroidectomy and unilateral cervical sympathectomy. Exophthalmos developed in all but 3 animals and persisted after death. The weight of the orbital contents was greater in the experimental animals than in controls, the retrobulbar tissue of the exophthalmic animals being 34 per cent. greater than that of the controls. This increase of weight was due to œdema of the orbital fat and extra-ocular muscles, which both showed histological changes similar to those found in biopsies of the orbital tissues in 6 human cases of the type already described. In the animals cervical sympathectomy did not prevent the development of the exophthalmos. Though this appeared to be somewhat slighter during life on the sympathectomised side, the difference between the two sides disappeared after death.

The importance of SMELSER'S paper lies in the fact that for the first time he has reproduced experimentally the histological changes found in man in the condition known in America as "malignant exophthalmos." He ends his paper with the observation that further analysis is necessary to establish the identity of the mechanism involved. We are still completely in the dark as to how the thyrotropic hormone of the pituitary brings about a gross œdema of the orbital contents. We are also ignorant of whether the mechanism responsible for the exophthalmos of Graves's disease is the same as that which is operative in the syndrome that BRAIN has termed "exophthalmic ophthalmoplegia." The influence of the thyroid and the pituitary upon one another is still largely unexplored. Much remains to be discovered, but enough has already been learned to encourage the hope that we may soon be able to speak far more confidently about the causation of exophthalmos and the nature of Graves's disease.

Prof. SIMON FLEXNER is giving a lecture in the physiological department at Cambridge on Monday next at 5 P.M. His subject will be epidemic poliomyelitis and epidemic encephalitis.

ON Feb. 24th and March 1st, at 5 P.M., Dr. B. E. SCHLESINGER will deliver the Milroy lectures to the Royal College of Physicians of London. He will speak on the public health aspect of heart disease in childhood.

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[1] Brain, W. R., *Trans. ophthal. Soc. U.K.* 1937, 57, 107.

[2] Smelser, G. K., *Amer. J. Ophthal.* 1937, ser. 111, 20, 1189.

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ANNOTATIONS

A BLUE SARCOPHAGUS

MANY Government documents bear signs of that skill in marshalling a mass of data and giving them coherence for which the upper ranks of the civil service are justly renowned. The supplementary report[1] of the Board of Control (Lunacy and Mental Deficiency), as we have already felt it our duty to indicate,[2] is not one of them. As in former years the first part embodies, in erratically alphabetical order, the reports of mental hospital superintendents as to the pathological work and research done during the year, and the second part (or appendix) reproduces the reports made by the Commissioners on their annual visit to each institution. A summary which prefaces the supplement is the only guide the reader has to the things that may interest him in this jungle. If the supplement contained only statistics of routine laboratory examinations, and a list of studies the results of which had been published during the year, such a lay-out would be unobjectionable, but at present a good deal of otherwise unpublished material is put forward here. It would perhaps be better, if the four existing specialist journals in this country will not accept papers reporting such work, that another less exacting journal should be created for the purpose; the writers would then at least know that their findings were likely to be read, and they would get the benefit of criticism. Certainly some of the brides of quietness buried in this official urn deserve to be brought to life and honourably ravished by the Quarterly Cumulative Index Medicus; there are, for instance, rare cases and interesting post-mortem findings, complete with discussion and references. How great is the need for classification in this omnium-gatherum may be judged from the twelve consecutive pages (177–188) which contain the following:—

An outline of the present position of tissue culture in the study of the nervous system

Abstracts of three investigations published elsewhere: into the incidence of neurosis, the detection of diphtheria carriers, and the treatment of enteric carriers by cholecystectomy

Detailed reports of cases of adrenal insufficiency, apoplexy (in a paraphrenic), and cardiogenic delirium

A long account of the work done in a dental department and another describing the therapeutic effect of a hair-dressing room in the hospital

Two lists of routine laboratory examinations

Records of cases having no direct psychiatric bearing (treatment of pyelitis with mandelic acid, cod-liver oil for burns, and scarlet fever caused by the hæmolytic streptococcus)

Observations on dysentery

Some details about new apparatus installed.

It is evident in the report that the Board of Control would like to see some sort of investigation going on in every mental hospital. But research, especially in a subject as difficult as psychiatry, can be so much wasted effort unless it is done by trained people or under expert direction. These pages show how wide is the qualitative range of psychiatric research in this country, from valuable work of international repute to futile groping and repetition. It is to be hoped that the new Psychiatric Research Bureau will direct and coördinate much of the energy that is now spilt. It should also ensure a better proportion between painstaking clinical research and laboratory studies; although the latter may appear more "scientific," they make little use of the psychiatrist's special knowledge, and expose him, unless he has exceptional resources, to the risk of unreliable findings. In some centres, as the reports show, experts in chemistry, pathology, psychology, and other disciplines have been brought in to coöperate with the clinical workers, with happy results. There is indeed so much impressive original work being done in our psychiatric hospitals that it is a pity when an undiscriminating olla-podrida lumps it together with mediocre, or less than mediocre, fruits of industry.

[1] The twenty-third annual report of the Board of Control for the year 1936. Part II. H.M. Stationery Office. 1938. Pp. 540. 8s.

[2] *Lancet*, 1937, 1, 212.

A DELINQUENCY CLINIC

IN his sympathetic remarks at the official opening last week of the new offices of the Institute for the Scientific Treatment of Delinquency Lord Roche suggested as a chief reason for public support the satisfaction to be gained from helping the weak and erring. Who knows, he asked, when we or ours may be in need of the like help? Actually it is true that those who have benefited most at the Institute's clinic have suffered from psychoneuroses similar to those which come under treatment every day at the Tavistock Clinic, the London Clinic of Psycho-analysis, and other psychiatric out-patient departments. But whereas at these clinics the danger of an encounter with the civil arm is only one of many possible complications and does not entitle to priority of treatment, at the Institute's clinic this danger constitutes the emergency for which the clinic was founded and forms an essential criterion in the selection of cases. Nothing but the urgent need of such a clinic could have brought together a gathering so large and distinguished as to strain its capacity. The magistrate's difficulty, said Lord Roche, was not so much in the determination of guilt or innocence as in the decision what sentence to impose, and, without taking sides on the ethics of punishment, he was quite clear in his own mind that at one end of the scale is the person who offends against the law from a weakness or infirmity which may be remedied or cured, and at the other end of the scale the person who has said "Evil, be thou my good" and is determined to live by preying upon society. Paraphrasing these words from the medical standpoint, it is agreed that the psychoneurotic cases, irrespective of the type of offence, have proved the most suitable and profitable to treat and have given the best results, normal cases being much more difficult, even if not hopeless.

Before this formal opening the clinic had already been working quietly for six months at the house in Portman-street, after accepting for four years the hospitality of the West End Hospital for Nervous Diseases. In the meantime the number of patients has steadily increased from year to year up to a total of 167 during the last twelvemonth. Most of them are referred from the courts by magistrates and probation officers, but an increasing number come at the request of their doctors or even on their own initiative. Apart from the lecture room where special courses are held for probation officers and others interested in delinquents, the clinic includes a room for complete physical examination and a series of consulting-rooms where patients are dealt with in

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the same atmosphere of confidence as in a private consulting-room. Dr. E. T. Jensen and the other founders of the Institute may well feel satisfied with the outcome of a venture which started in 1932 as a result of an investigation, on behalf of the Medical Research Council, of a number of prisoners in Holloway. Lord Roche, as the result of his own experience, described the help now being given as essential to administrators of the law; and while the clinic may be regarded as an efficient out-patient department the need becomes daily more apparent of an observation centre and an in-patient department for those on whom delinquency has already taken a firmer hold. No rich man could find a more remunerative use for a sum of £30,000 than putting it into the hands of the Institute for this purpose.

A FRATERNAL MISSION

IN the supplement to the *British Medical Journal* of Feb. 12th, Sir Henry Brackenbury gives an account of the mission he undertook last year on behalf of the British Medical Association. The chief object of the mission was to advise the New Zealand branch of the Association on the position created by the announced intention of the New Zealand Government to introduce a scheme of national health insurance into the Dominion Parliament next session, but, at the request of the Association, Sir Henry's tour included a visit to the United States and a return journey via Australia, Malaya, Ceylon, Bombay, Aden, and Malta. In the centres of the Empire visited he was able to get into personal touch with the far-flung work of the Association in many lands, and his visit to the United States was particularly well timed in view of the problems of medical practice that are now engaging the attention of the profession in that country.

The present position in New Zealand is regarded with considerable anxiety by the medical profession. The Government, which came into power with an enormous majority after the general election in the autumn of 1935, have secured the enactment of measures that have made drastic changes in the social and economic life of the country, including the institution of a 40-hour week; and though their health insurance scheme has not yet been published, or even it seems definitely formulated, it is known that influential members of the Government party are pressing for the establishment of a medical service for the whole population. Such a scheme, involving the virtual abolition of private practice, would be unacceptable to the medical profession who, though not opposed to health insurance, think it should apply only to those unable from their own resources to pay for the medical care they may require; and it is contended that such persons are relatively fewer in New Zealand than in most other countries. The position is made more difficult by the chaotic nature of New Zealand's local government, which is administered by a large number of uncoördinated ad-hoc bodies, directly elected and usually on party lines. The public hospitals are administered by hospital boards, which are numerous and in many areas fail to command public confidence, and the profession are opposed to any scheme that should attempt to place health insurance in the hands of these bodies. Further difficulties are created by the sparse population of many areas in New Zealand, which though rather larger than Great Britain, has only 1,500,000 inhabitants. A health insurance scheme in such a country must obviously be capable of adjustment to meet widely varying local conditions. In view of these difficulties, it was fortunate for New Zealand that both the Government and the profession should have had opportunities for conferring with Sir Henry Brackenbury, who from his long experience as a general practitioner, a leader in the counsels of the British Medical Association, and a distinguished local administrator has unique qualifications for advising in the present emergency.

Sir Henry has some interesting things to say about Australia, where the Commonwealth Government are now preparing a health insurance scheme with the assistance of Sir Walter Kinnear and Mr. T. Lindsay of the Ministry of Health. In the United States, where he addressed meetings of practitioners in five cities, he found that health insurance was regarded with interest and also with antagonism by many doctors, largely from the fear that it would bring the medical profession under the control of party politicians. He also found widespread misunderstandings of the British health insurance system and its effects on the profession. One of the conclusions that emerge from Sir Henry's valuable report is that the conditions under which medical practice is carried on vary widely in different countries, that each country has its own special problems, that no scheme of health insurance has any chance of success unless it provides a solution of those problems, and that a solution is not likely to be forthcoming without the goodwill and close coöperation of the medical profession.

CAVES IN PALESTINE

THE discoveries of Miss Dorothy Garrod's expedition in caves at Mount Carmel, the subject of Sir Arthur Keith's lecture last Monday to the Royal College of Surgeons, have thrown fresh light upon the inhabitants of Palestine in the early Stone Age. The caves contained the deposit of centuries of habitation, and yielded a rich assortment of stone tools, fossils of animals, and bones of men and women, extending over a period of 100,000 years before Abraham buried his wife in the cave of Machpelah in the land of Canaan. One cave was a veritable graveyard with the skeletons of ten people, which careful burial and the action of the local limestone had combined to keep in a remarkable state of preservation. For the last few years Sir Arthur Keith and Mr. McCown have been restoring these finds at the Buckston Browne research farm at Downe in Kent. Although these people date from before the Neanderthalians of Europe they have many more features in common with modern man and seem to have come from a stock akin to that which gave the world its Caucasian or white inhabitants. They were tall, the men being between 5 ft. 8 and 5 ft. 11 and the women between 5 ft. and 5 ft. 4. Their eyebrow ridges resembled a gorilla's and they had massive jaws, large mouths, thick strong necks, and a greater variety of noses than would be found in one place at the present day, suggesting a people in the throes of evolutionary change. Though simian in appearance their brains were as large as a modern man's, though of simpler convolutionary pattern, and their elaborate burials —a hall-mark of humanity—point to a high degree of intelligence. They seem to have believed in an after life, as one man had had a boar buried with him, presumably so that he should not be deprived of his favourite roast in the next world. There was evidence too that in warfare they had advanced beyond the stage of the stone club. One male skeleton had a wound which penetrated the hip-joint and entered the pelvis, and a cast made of this

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showed that it had been made by a four-sided spear. The violence needed to produce this wound was strong evidence of malicious intent, and this probably represents the earliest war wound on record.

RADIOGRAPHY OF THE URETHRA

SINCE 1910 urethrography has been a recognised method of diagnosis, and much has been written about it. Oltramare and Martinet[1] of Geneva employ the usual technique, using a 40 per cent. solution of Lipiodol. Their only addition is a method of fixing the catheter through which the injections are made; they do this by surrounding the penis with a pneumatic bandage (like those used in estimating blood pressure) to which are attached small chains that hold the soft catheter in position. Two plates are exposed—one anteroposterior and the other oblique—so as to avoid the shadow of the ischial tuberosities and heads of the femurs. The illustrations of this paper testify to the progress that has been made in the technique of outlining the urethra, for lesions so minute as distended diverticula are clearly demonstrated. A series of illustrations also show various types of normal urethra. Urologists who have hitherto considered urethrography of little practical value will be convinced, after reading this article, of its greater potentialities. The photographs obtainable help to explain the physiology as well as the pathology of the urethra. Moreover, the report in our issue of Feb. 5th of two cases of air embolism following the ordinary urethroscopy make one additionally disposed to consider this alternative.

VENOUS THROMBOSIS AS A SIGN OF VISCERAL CANCER

SPONTANEOUS venous thrombosis in both the upper and lower limbs serves as a valuable sign in the diagnosis and prognosis of visceral cancer. But as a clinical fact it has been wellnigh forgotten of recent years, and it is generally ignored in modern practice according to A. P. Thomson,[2] who reports three cases. In the first, the attack of thrombosis occurred in the veins of the limbs of a woman in the early forties, who died of malignant disease in the liver 14 months after the original thrombosis. In the second patient two attacks of thrombosis in the veins preceded and several attacks accompanied gastric symptoms considered on radiographic evidence to be due to a malignant growth of the cardiac end of the stomach, which gave rise to obvious metastases in the liver before death a few months later. Vague abdominal symptoms in the third patient led to a complete investigation of his alimentary tract with negative results, but thereafter he had several attacks of thromboses and ultimately a laparotomy revealed a carcinoma of the head of the pancreas, with multiple secondaries in the liver.

The thrombosis often precedes evidence of the neoplasm. In none of Thomson's cases was the evidence conclusive that the stomach was primarily affected, and this bears out Prof. John Ryle's statement that the association is rare, at least as compared with the presence of peripheral neuritis.[3] Therefore, although Thomson is right in calling our attention to the relationship, which Trousseau summed up when he said—

"When you are undecided about the nature of a disease of the stomach, when you hesitate between a chronic gastritis, a simple ulcer and a carcinoma, a phlegmasia alba dolens occurring in the leg or in the arm will put an end to your indecision, and you will be able to assert positively that a cancer is present"

we must remember that that cancer may be in other abdominal organs besides the stomach itself.

THE EXCRETION OF SEX HORMONES IN URINE

IN his paper read at the Royal Society of Medicine last week Dr. R. K. Callow took a critical view of the significance of the excretion of sex hormone activity in the urine. He spoke particularly of the extent to which sex hormones are subject to destruction and transformation in passing through the body. If, with the present experimental methods, never more than 20 per cent. of hormonal activity has been recoverable in the urine after administration—and this proportion is attained only with high doses—then it does not seem unduly cautious to reserve judgment on the diagnostic value of assays of urinary hormone in cases where there is no gross disturbance of hormonal activity. The position may of course be improved when knowledge of the chemistry of hormone metabolism increases. Thus Venning and Browne[1] have demonstrated the transformation of progesterone, the hormone of the corpus luteum, into pregnanediol by the body; and the recovery of this inactive compound in a chemically recognisable and weighable form (sodium pregnanediol glycuronidate) in the urine in the proportion of 12–46 per cent. of the equivalent of hormone injected is a better argument for this particular type of urinary hormone assay than has been advanced for any others. The investigation of male hormone activity excreted in the urine has been the special concern of the group working in London at the National Institute for Medical Research, and their results, which are in many respects complementary to and confirmatory of the results of the groups working in Amsterdam[2] and in Chicago,[3] emphasise the lack of simple relation there may be, not merely between administered and excreted hormone activity, but also between physiological state and hormone in the urine. Any superficial theory which connects androgen excretion with male sexual function breaks down completely when it is shown that men cannot be distinguished from women, or normal men from eunuchs, in respect of urinary androgen. The origin of these androgenic substances of the urine was discussed in our own columns not long ago by Dr. A. S. Parkes,[4] and further evidence is accumulating that one major source is the adrenal cortex. Dr. Levy Simpson, in his contribution to the discussion reported on p. 435, described how the idea of finding an increased excretion of male hormone in virile women arose in 1933. Later, Simpson, de Fremery, and Macbeth were able to demonstrate such an excess of male hormone activity in some cases of adrenogenital syndrome.[5] In patients with adrenal tumours the urinary excretion reaches very high levels indeed, and in a case from the London Hospital mentioned by Dr. Callow it amounted at one time to 3500 international units per litre. Moreover, both in this case

[1] Oltramare, J. H., and Martinet, R., *Schweiz. med. Wschr.* Jan. 1st, 1938, p. 12.
[2] *Bgham med. Rev.* 1937, 12, 259.
[3] *Clin. J.* 1937, 66, 133.

[1] Venning, E. H., and Browne, J. S. L., *Endocrinology*, 1937, 21, 711; see *Lancet*, Jan. 1st, 1938, p. 39.
[2] Dingemanse, E., Borchardt, H., and Laqueur, E., *Biochem J.* 1937, 31, 500; *Schweiz. med. Wschr.* 1937, 187, 670.
[3] Gallagher, T. F., Peterson, D. H., Dorfman, R. I., Kenyon, A. T., and Koch, F. C., *J. clin. Invest.* 1937, 16, 685; Kenyon, A. T., Gallagher, T. F., Peterson, D. H., Dorfman, R. I., and Koch, F. C., *Ibid*, 1937, 16, 705.
[4] *Lancet*, 1937, 2, 902.
[5] Simpson, S. L., de Fremery, P., and Macbeth, A., *Endocrinology*, 1936, 20, 363.

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and in another with a lower level of excretion, a readily characterisable compound could be isolated from the urine—namely, dehydro-androsterone, previously known as a constituent of normal urine present in very small amount. Now that methods of extraction, of biological assay, and even of rapid chemical examination are becoming established, hormone analysis of the urine can be of great diagnostic assistance in disorders of this kind—and of course in pregnancy. But in regard to minor endocrine disturbances a cautious and conservative attitude must be maintained until the results of hormone analysis in normal subjects are more consistent and until their assumed significance rests on a sounder scientific basis.

AN INTERNATIONAL PHARMACOPŒIA

CHANGES within the League of Nations during the past eight years are reflected in the names of the countries represented, in the technical commission of pharmacopœial experts whose appointment by the Health Committee of the League we reported last week. When the international agreement on the formulas of potent drugs was signed at Brussels in 1929, Italy, Germany, and Japan participated. They are now absent and Soviet Russia, which has since become a member, has been invited to a seat on the commission. Half the eight members[1] are men who have been associated during these years with the technique of international conferences, and all four of them are members of the pharmacopœia commissions of the nations they represent, two being chairmen of their national commissions. The representative of Russia has not yet been nominated, but the Government of the U.S.S.R. is said to be anxious to assist the plan.

The arguments in favour of an international pharmacopœia are well known: it would expedite the spread of medical knowledge, would enable pharmacists to dispense prescriptions brought them by travellers from other countries, and would be a convenience to manufacturers of active principles and galenical preparations who now have to work according to a variety of standards. The delay in formulating a book of standards is largely due to the causes that frustrated the building of the tower of Babel; for the Latin, and even the French, of many men learned in the science of drugs does not suffice for untrammelled intercourse. For these and for geographical reasons, and for others rooted in idiosyncrasies, the completion of the first edition of the much-needed volume cannot be speedily accomplished. Nevertheless the decision of the Health Committee of the League is an important step towards an object long desired by medical men of many nationalities. In some directions international collaboration has been making progress despite the difficulties of the past few years. Thus the permanent Commission on Biological Standardisation, whose decisions are accepted by the British and other pharmacopœia commissions, is a happy example of the success of common sense. The Health Committee has perhaps been wise to limit the commission to eight members, for it is a common experience that small committees work more rapidly than large ones. The fact that the communiqué which notifies the nominations specifies the places with which the nominees are associated, rather than the nations to which they belong, suggests a wish to cause no disappointment to countries which, unfortunately, are not actually represented.

When the new commission settles down to work it would not be surprising if one of the first matters to which it devoted attention were Article 8 of the 1929 agreement, which enumerates 77 drugs and preparations that should conform to specific descriptions. Most of these are powerful poisons that are administered in small doses, but the list might advantageously be extended to include such products as quinine, chloroform, ethyl chloride, adrenaline, the salicylates, hexamine, the salts of mercury, camphor, and indeed many other drugs that are definitely active therapeutically. It is true that such an extension would be an addition to the labours of the commission, but in the long run the inclusion of as many items as possible in an international pharmacopœia would greatly increase its usefulness.

[1] The members so far appointed are Dr. C. H. Hampshire (London; chairman), Prof. H. Baggesgaard (Copenhagen), Prof. V. E. Zunz (Brussels), Prof. M. Tiffeneau (Paris), Prof. R. Eder (Zurich), Prof. L. van Itallie (Leyden), and Prof. E. Fullerton Cook (Philadelphia).

THE TREATMENT OF AURAL VERTIGO

AURAL vertigo may arise from such diverse causes as impacted wax and tumour of the acoustic nerve. When the symptom accompanies suppurative disease of the ear, it indicates an acute labyrinthitis. Often, however, it is associated with non-suppurative disease of the middle ear and may be cured or relieved by appropriate treatment, and especially by restoring the patency of the Eustachian tube. Although there is probably always some diminution of hearing in the affected ear, at any rate during the attack, functional tests often show a deafness of the nerve—rather than of the conduction—type, for which no obvious cause can be found. Opinion differs widely about the underlying cause and the most appropriate treatment. Wright[1] believes that all such cases are secondary to a focus of infection; he calls the condition "focal labyrinthitis" and invokes the analogy of chronic iritis; he quotes 22 cases treated by eradication of septic foci, all of which were cured of their vertigo. Mygind[2] of Copenhagen considers the underlying condition to be a disturbance of the general water metabolism which produces an intracellular œdema of the labyrinth, and has obtained good results by drastically curtailing the intake of fluids; he quotes Fürstenberg in the United States who concludes that the essential factor is retention of sodium and treats these cases by reduction of salt in the diet, at the same time giving ammonium chloride in large doses of 3 grammes three times a day.

The attacks of vertigo vary greatly in frequency, severity, and duration in different patients and in the same patient at different times. They can be so distressing and disabling that even major operations for their relief are entirely justified. Of these operations intracranial division of the VIIIth nerve is well established; it has now been refined by limiting the section to the vestibular nerve. With due skill and experience the facial nerve can be avoided, and the mortality is very small. Hautant[3] has reported good results, amounting to cure in about half his cases, by simple opening of the external semicircular canal, while Mollison[4] suggested the injection of absolute alcohol into the opened canal and obtained cure in 22 of 28 cases. These procedures involve a mastoid operation, to obviate which Wright injected alcohol through the oval window, with the result that the vertigo was cured but otitis media and facial paralysis developed. It is with the object of avoiding

[1] Wright, A. J., *J. Laryng.* January, 1938, p. 97.
[2] Mygind, S. H., *Proc. R. Soc. Med.* 1937, 30, 1485.
[3] Hautant, A., *Bull. Acad. Méd. Paris*, 1934, 111, 933.
[4] Mollison, W. M., *J. Laryng.* 1936, 51, 38.

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these complications that Mr. Roydon Peacock has carried out the investigation reported on p. 421. As the labyrinth is a closed cavity with rigid walls, it is obvious that any injection into it must be accompanied by the return of a similar quantity of fluid into the tympanum, and that permeation of the irregular cavity must be uncertain and incomplete, while the escape of fluid containing a large proportion of alcohol into the tympanum is likely to cause severe inflammation. For this reason Mr. Peacock has ingeniously employed a needle with a double lumen by which suction is applied at the same time as injection, so that a circulation of alcohol through the labyrinth is obtained.

There remains the important risk of facial paralysis after these injections. Mr. Peacock found that alcohol penetrated through the thin bony wall from the vestibule into the facial canal within 24 hours, although it was not to be found there immediately after the injection, and he accordingly makes the useful suggestion that the alcohol should be washed out after a few minutes by normal saline through the same apparatus. The cochlea, being a long tube connected with the vestibule at one end only, is less readily injected than the semicircular canals, and was found not to be infiltrated when a small quantity, 0·5 c.cm., of alcohol was used, although the canals were well filled. Mr. Peacock thinks this of only theoretical value, because most of these patients suffer from tinnitus and this, if absent, might be induced by the injection which would in itself probably destroy any useful hearing. The tinnitus, however, is not likely to be cured by the injection; it persisted in his first case, and sometimes does so after section of the whole auditory nerve. Many of these patients have a useful degree of hearing in the affected ear; it is by no means certain that it will be destroyed by an injection which spares the cochlea and it seems to us worth while to try to do so. We hope that Mr. Peacock's investigation will be followed up by himself and others, for it offers a method of giving relief to these distressing cases with a minimum of surgical interference.

FERTILITY AND INTELLIGENCE

THOUGH the impending decline in the numbers of our population attracts most attention, some believe that differential fertility is a problem of nearly equal importance. Numerous studies have demonstrated an inverse relationship between fertility and social status; the less skilled and the more poorly paid the occupation the higher tends to be the fertility—though the larger size of the family thus produced tends to be reduced by a differential mortality. This association must naturally be interpreted as denoting an inverse relationship between fertility and intelligence. Direct attempts to measure the strength of that latter association have been made less often, and some of those made have not been above reproach as regards their sampling technique. It is certainly difficult in the field to eliminate bias, but the difficulty appears to have been overcome in an excellent study reported by Fraser Roberts, Norman, and Griffiths.[1] The group of children they investigated represents an almost complete sampling, by age only, of the entire population of the city of Bath. The intelligence of each child was tested, sometimes by more than one scale, and from the results there is no reason to suppose that the population of this city differs materially from that of other urban areas. Here, between the intelligence of the child and the number of living sibs that he or she has, there is a significant and negative association (a correlation coefficient of −0·224). Intelligence falls steadily as the number of sibs increases from 0, and similarly the number of sibs falls steadily as intelligence increases from the lowest levels to the highest. On this large sample there is no hint of anything other than the simplest straight line relationships—no indication, for instance, that fertility falls again as the lowest levels of intelligence are reached. It cannot, however, tell the whole story, for celibacy and childless marriages do not come into the sample. The public and private schools were found to contain children whose average number of sibs was very small—too small, in fact, to ensure the survival of the section of the population from which they are drawn. Further, the number was far smaller than would be expected on the basis of their superiority in intelligence to the general population, which is a clear indication that even for the same grade of intelligence there is still a considerable association between fertility and social class. This, and other points, the authors hope to explore in a further study of their data.

[1] Roberts, J. A. F., Norman, R. M., and Griffiths, R., *Ann. Eugen., Camb.* January, 1938, p. 178.

HEART FAILURE AFTER PULMONARY EMBOLISM

ALTHOUGH it has been said that quite large areas of the pulmonary circulation may be blocked without seriously disturbing the general circulation, we know that even a small pulmonary embolism in man often causes death by heart failure in a few hours. The explanation of these deaths is not clear, but it has been suggested that a pulmono-coronary reflex involving spasmodic occlusion of the coronary arteries may account for them. This suggestion is supported by the fact that the clinical (including electrocardiographic) signs of a pulmonary embolism in man often resemble those of coronary occlusion. Hochrein and Schneyer[1] have inquired into the existence of such a reflex in experimental pulmonary embolism in dogs, by injecting sago granules into the subclavian vein and noting the reactions in the coronary arteries and main vessels. They found that blocking of even a small branch in the pulmonary circulation produced an immediate rise in pressure in the pulmonary artery, presumably from reflex spasm. This was sometimes accompanied by a fall in the aortic blood pressure and sometimes by a rise. In the coronary arteries the reactions were variable. In the left there was usually an increased circulation, but in the right there was often a diminution of blood flow due to a spasmodic constriction. The right ventricle, working under the burden of an increased pulmonary blood pressure, was then liable to suffer coronary insufficiency resulting in heart failure or ventricular fibrillation. The electrocardiographic signs were variable, but mostly indicative of a right-sided heart failure. Hochrein and Schneyer think these findings indicate that strophanthin and digitalis will probably be ineffective remedies in pulmonary embolism, and may possibly be harmful, since they are likely to increase the load borne by the right ventricle. They were unable to determine the mechanisms of these reactions but they could find no clear evidence of any vagosympathetic control, since severing the vagus and administering atropine and ergotamine tartrate did not interfere with the reactions. They were driven to the conclusion that something in the nature of an axon-reflex must account for the sudden heart failure in pulmonary embolism.

[1] Hochrein, M., and Schneyer, K., *Münch. med. Wschr.* 1937, 49, 1929.

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SPECIAL ARTICLES

PSYCHONEUROSIS IN HOSPITAL PRACTICE

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IN out-patient hospital practice the recognition of patients with psychoneuroses is important so that time may not be wasted in investigating and treating minor or imaginary physical disorders, and because correct diagnosis is essential for rational treatment. The fact that so many psychoneurotic patients attend with diagnoses of anæmia, hyperthyroidism, tuberculosis, heart disease, and rheumatism, for which they may have had prolonged treatment, is evidence that the diagnosis is still often overlooked.

This paper describes an inquiry made into the incidence of psychoneurosis among out-patients attending Guy's Hospital. Following Gillespie (1928) these points have been taken into consideration in making a diagnosis :—

(1) The *symptoms* themselves may, by their bizarre qualities and their dissimilarity to recognised organic syndromes, suggest their neurotic origin. Pains described as "twisting" or "tearing," sensations resembling "balls of fire" or "cold water dripping" inside, or "something moving under the skin" are examples. The feeling of persistent pressure on the vertex of the skull is known to be commonly psychological in origin; so are certain special symptoms such as "globus hystericus," or aphonia of adductor type. It is also recognised that a variety of symptoms distributed widely over the body can usually be accounted for only on a psychogenic basis. If there are in addition symptoms of the type usually associated with the expression of fear—such as trembling, palpitations, and feelings of weakness—the diagnosis of psychoneurosis is made extremely probable.

(2) The discovery of some source of *anxiety or mental conflict*, accompanying or immediately preceding the onset of symptoms, will lead one to suspect a psychogenic origin. Often such a history is elicited with ease, but sometimes it is only after the patient's confidence has been gained that any source of mental unrest is admitted. In other cases, again, though the symptoms are clearly psychogenic, no such history can be obtained.

(3) The *precipitation of symptoms*, such as fainting or palpitations, by minor emotional events is suggestive of their psychogenic origin. Such events included casual observance of weddings or funerals, "rows" at work, dramatic incidents seen at the films, street accidents or merely the excitement of meeting strangers, or being in a crowd. It must not be forgotten that certain organic ailments, such as angina pectoris, may be precipitated in similar circumstances.

(4) A history of *emotional disturbances*, sometimes described as "nervous breakdowns" but often masquerading under some title with a more organic flavour, often serves as a clue. It will usually be found that these illnesses have arisen at periods of mental stress. In men who are old enough a war neurosis is often encountered.

(5) There must be *no evidence of physical disease or abnormality sufficient to account for the symptoms* on an organic basis. Lack of such evidence, however, should never be regarded as adequate reason for diagnosing psychoneurosis unless there is also positive evidence of psychological disturbance. It is important to remember that a neurosis may be superimposed on an organic condition, possibly of a serious nature.

Intimately bound up with the development of neurosis is the character of the patient. It may be evident that he has a personality that would be a suitable basis for such a condition. That he is unduly anxious, unstable, and lacking in confidence may be observed in taking the history; the presence of nervous mannerisms and tics, the manner of conversation, and the whole bearing and appearance should be taken into consideration, though without attaching too much importance to them. Inquiry may show that character traits such as those mentioned have been present as long as the patient can remember. A partial explanation may be provided by asking about the environment of childhood days, the attitude adopted towards the patient by parents and brothers and sisters, and his to them, or the fact that he is an only child or the spoilt youngest of a large family. Physical defects of development may help to account for a neurotic attitude to life.

Even after conscientious investigation along these lines, the diagnosis remained doubtful in some cases —those with intractable pain for which no organic cause could be found, those with unexplained dyspepsias, and those with some source of worry which was nevertheless being faced so frankly that it seemed unlikely to be responsible for the symptoms complained of. Merely negative evidence of organic disease was never by itself regarded as sufficient for a diagnosis of psychoneurosis. In these cases further observation sometimes provided evidence enabling a definite diagnosis of organic or psychological disease to be made.

Incidence of Psychoneurosis among General Medical Out-patients

The cases here discussed had all been referred to general medical out-patients * by their medical practitioners for special investigation and opinion. Brief notes have been kept of the diagnoses made, the results of investigations, and often of the subsequent progress. It has however been impossible to obtain complete records in all cases, for often the patient did not attend after the first visit, and often he lived too far away.

In the course of investigating 1297 patients attending for the first time a diagnosis of "psychoneurosis" was made in 209, or 16 per cent. This may be regarded as a minimum figure. The majority of these had no recognisable organic abnormality, but in a few of them physical conditions of minor importance (such as postural defects, mild degrees of anæmia, or menstrual disturbances) were present in addition. Such a minor condition often appeared to serve as a stalking-horse for the undetected advance of the neurosis. In every case it was thought that the treatment of the psychological condition was of primary importance compared with that of any accompanying physical abnormality. No attempt has been made to assess the frequency with which gross organic disease, such as gastric ulcer or disseminated sclerosis is complicated by attendant neurotic manifestations, though such association is common.

Neurotic Disorders by Age and Sex

Analysis of these figures shows considerable differences in the frequency with which psychoneurosis was diagnosed at different ages and for the

* The figures given, therefore, do not take into account those cases referred directly by doctors to the psychological and neurological out-patient departments.

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two sexes. The figures given in the accompanying Table refer to the last 950 subjects seen.

C = Number of cases. N = Incidence of neurosis (per cent.).

—	C	N	C	N	C	N	C	N	C	N	C	N
Ages (years)	*10–19*		*20–29*		*30–39*		*40–49*		*50–59*		*60–80*	
Males ..	41	10	80	25	76	12	91	11	100	6	65	3
Females ..	61	20	140	26	91	24	100	21	67	6	38	—

Neurosis was diagnosed almost twice as often in women as in men. The diagnosis was made in 20 per cent. of 497 women, and in 12 per cent. of 453 men. It is surprising that the figure for males and females is almost identical between the ages of twenty and thirty. At this age, however, the total number of women seen was almost twice as great as men, so that considerably fewer cases of neurosis were actually seen in young men than in young women. That the peak period for males should be at this time of life is not surprising, since the strain of daily life is then apt to be particularly heavy and in many ways greater than for women of the same age. Difficulties associated with employment are numerous; for instance, many young men feel forced to keep on with uncongenial work for fear of unemployment; progress is apt to be slow and disappointing; the responsibilities associated with married life, either in contemplation or its early stages, are great. After thirty, ideals become more adjusted to reality, the routine of a settled occupation becomes accepted as inevitable, and the stability that accompanies approaching middle age begins to exert its effect. Halliday (1935), in his figures referring to a group of patients selected somewhat differently, finds that the highest figures for men are between the ages of thirty-five and forty-four.

There is no rise in the incidence among women at the time of the menopause. This fact has also been observed by Halliday (1935) and Gillespie (1935). After fifty the incidence of neurosis becomes relatively insignificant for both sexes.

Symptoms

The symptoms of which these patients complained were so various that it has been thought impracticable to attempt to group them. It was uncommon for a single symptom to be the sole cause of complaint. Occasionally one symptom—such as difficulty in swallowing or frequency of micturition—was alone complained of; but even in these patients, general symptoms of the vague type referred to in the next paragraph were often admitted on further investigation.

Dyspepsias, characterised by flatulence, nausea, and feelings of fullness; headaches, commonly vertical or occipital and accompanied by a feeling of "dizziness"; and generalised pains, often with a curious mode of spread, were commonly encountered. Fainting attacks, anorexia, fatigue, insomnia, and "nervousness" were all given as leading symptoms by individual patients. Less commonly a frankly hysterical condition, such as weakness of a hand, or persistent vomiting were seen. Attacks of hysterical over-breathing, wrongly diagnosed as asthma, were seen in two patients; continuous sighing respiration in another.

Many patients complained, besides such symptoms, of palpitations, trembling feelings, sudden overwhelming weakness, and depression. These feelings would come on in attacks, often precipitated by some minor emotional crisis. Commonly they complained of these anxiety attacks with complete absence of any local symptoms. Insomnia was almost invariable, as was depression, which could, however, generally be ascribed to some definite psychological cause. Suicidal thoughts were uncommon.

The Precipitating Factor

Precipitating factors of psychological origin were discovered in 111 subjects out of 148 of whom full notes have been kept. In about half these patients there were two and sometimes three factors that appeared to be of almost equal importance in the precipitation of symptoms. These have been grouped under the following headings:

Anxiety dependent on physical and mental factors leading to inferiority feelings, classified as cases of constitutional inferiority	20
Anxiety due to morbid fear of disease, often associated with above	25
Anxiety following physical trauma or sudden shock	10
Anxiety connected with work	23
Anxiety dependent on—	
1. Unsatisfactory home life in single persons	18
2. Unsatisfactory social life in single persons	9
3. Difficulties connected with matrimonial engagement	11
4. Difficulties of married life	9
5. Health or death of relatives or friends	26
6. Miscellaneous causes	10

Of the remainder, some appeared to be cases of simple depression, which came on without any psychological cause as far as could be ascertained; some of these had had similar attacks previously from which they had recovered. These subjects appeared to be mild cases of manic-depressive psychosis. In others a fuller investigation into the mental condition would probably have led to the discovery of adequate mental cause, which had been repressed more firmly than in those whose precipitating factors have been analysed above.

The factors under each of these headings will be briefly discussed with illustrative case-histories.

ANXIETY DEPENDENT ON CONSTITUTIONAL INFERIORITY

Only subjects in whom such feelings of inferiority appeared to have been pre-eminent throughout life are included in this group. Feelings of inadequacy of minor degree are almost universal among the neurotic. Where additional environmental factors were present they were usually trivial and would have been quite insufficient to cause symptoms in a more stable personality.

The characteristic feature of the group as a whole was the chronicity of the condition, the frequency of similar breakdowns earlier in the history, and the refusal throughout life "to take a chance." In addition many of them were poorly developed physically, and some appeared to be mentally below the average. The following is an example:—

CASE 1.—A. B., aged 46, a bottle-washer when last employed, complained of giddiness and a feeling that his legs were giving way. He never actually fell down in these attacks. Physically and mentally he was below the average. He lived at home with his parents, with whom he was on good terms. He had never married because he had "never been able to afford it." Always a worrier, he had never been able to keep a job long. The present symptoms had become severe since he had recently become unemployed again.

In this man there appeared to be no severe emotional conflict and no real source of anxiety. His symptoms seemed to depend on his lack of confidence in his own ability.

Many of these patients had always been ailing as children, and life in childhood had often been unhappy.

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Among the women in this group one had some degree of facial hirsuties, about which she was very sensitive, and one other was obese and unattractive. Of these 18 patients 12 were men and 6 women.

ANXIETY DUE TO MORBID FEAR OF DISEASE

Morbid fear of disease is an incident in the course of many neuroses, but in these cases it appeared to be a predominant factor in the precipitation of symptoms. In 6 of them symptoms had followed the discovery of some minor illness from which recovery had taken place. Thus C. D., a girl of 17, complained of suffocating feelings and attacks of palpitation that dated from the discovery of a slightly enlarged thyroid gland at puberty. E. F., a man aged 40, complained of frequency of micturition and vague general symptoms that dated from an attack of acute nephritis two years previously. No evidence of hyperthyroidism or renal disease was found in these cases. In both reassurance was followed by complete relief.

Illness in friends or relatives aroused a fear of disease in 6 patients. Thus G. H., aged 28, had had queer precordial sensations since a friend at work had died suddenly with cardiac failure. A still more striking case is the following:—

CASE 2.—I. J., aged 24, attended with a sensation of throbbing in the ears and palpitations. His father had died of heart disease. He was engaged to a girl with severe rheumatic valvular disease of the heart. He had given up athletic activities at first largely because his fiancée was unable to take any physical exercise, and later he began to fear that his own heart might be damaged if he exerted himself. There was no evidence of heart disease. The mental association between the condition from which his father had suffered and which was responsible for his fiancée's ill health was pointed out and he readily accepted the suggestion that his own symptoms were due to anxiety over her condition. The question of advisability of marriage to an invalid was an added source of anxiety. He was encouraged to take up some form of exercise. In a few weeks' time he reported that he was much better, and ten months later wrote to say that he was free from symptoms and leading an active life.

In 3 women of menopausal age a morbid fear of disease was prominent; 4 middle-aged men had a persistent fear of cancer, 2 being chronic hypochondriacs whose obsession had been present for a number of years.

ANXIETY ATTRIBUTED TO MINOR PHYSICAL OR MENTAL TRAUMA, NOT INCLUDED UNDER OTHER HEADINGS

This is a small and rather heterogeneous group of patients whose symptoms date from some mental or physical trauma. In 6 instances some form of injury, a blow in 2, a motor accident in 2 more were responsible. The question of compensation was undoubtedly maintaining the condition in 2 cases. In none was the injury adequate to give rise to an organic condition that could account for the symptoms, nor were these suggestive of an organic pathogenesis. A burglary, a fire, and a dental extraction had initiated symptoms in other cases. It is possible that some deeper complex, which was not elucidated, had been affected by these incidents, and was really responsible for the symptoms.

FACTORS CONNECTED WITH WORK

In 23 subjects anxiety was dependent on factors connected with occupation or lack of it. Other factors were also present in many. The group comprises 12 women and 11 men. In 3 only did unemployment account for the symptoms. This factor will naturally vary considerably with local labour conditions. Halliday (1935) in his survey finds it to be an important factor among men.

Actual dislike of employment was responsible in 7 cases; 2 of these were inadequate personalities who had hoped to rise to better positions of responsibility beyond their powers. In 2 cases, both women, inability to get on with employers or those directly over them appeared to be the important factor. Sometimes the responsibility or actual pressure of work seemed to have been sufficient to cause symptoms. Thus one woman had had symptoms since being put in charge of a machine which she did not understand, so that she was constantly in fear of an accident. Two patients were able to manage with the usual routine work, but at times when business was particularly brisk, necessitating extra work, symptoms developed. In others, prolonged hours of work, with the resulting fatigue and inability to enjoy any social life, appeared to be responsible. The following case illustrates the combined effect of uncongenial occupation and lack of social life.

CASE 3.—K. L., aged 20, was employed in an engineering firm. He complained of flatulence, fatigue, and a feeling of "can't be bothered." He did not like his work, and put down his failure to get a better post to the fact that he had failed in an examination for which he had done a lot of work. His home was in the north, and he had no friends in London; he found southerners difficult to get on with. It was pointed out that he might still obtain work he liked better if he made the effort, and at the same time he was encouraged to take up some form of exercise; he had previously played games but had given them up recently. When seen a month later he had carried out this advice, had made contact with some fellow north-countrymen in London and had arranged for a fresh job which he thought held more chance of advancement. He felt more vigorous and his dyspeptic symptoms had disappeared. Nine months later he was well and contented though he still had slight dyspepsia at times.

ANXIETY DUE TO UNHAPPY HOME LIFE IN UNMARRIED PERSONS

The subjects in this group are nearly all young. An unhappy upbringing is perhaps one of the most potent factors in the development of a neurotic personality, and is found as a background in the history of many neurotic patients.

The ways in which home life can be made unhappy for children and young people are numerous. The constant quarrelling of parents was an evident source of tension in 5 cases. Alcoholism on the part of one parent, actual maltreatment by father or mother, and a feeling of neglect were encountered in 1 case each. In a boy of 12 who was nervous and somewhat backward for his age, constant jeering and nagging by the father had led to neurotic symptoms. In one case overwhelming solicitude on the part of the parents had been predominant in causing chronic invalidism. The following examples illustrate two ways in which unhappiness at home may lead to symptoms.

CASE 4.—M. N., aged 25, complained of headaches and a feeling of dizziness which was not true vertigo. He had not felt well for six months and the headaches had come on recently almost daily. His parents, with whom he lived, had never got on well together. He was in constant fear of family quarrels. His symptoms dated from a severe disagreement between them, in which he had been involved. The headaches always came on while he was in the tube on the way home from work. This young man was an only child, very dependent on his parents, and below the average intelligence.

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CASE 5.—O. P., aged 16, also complained of headaches which had been present almost continuously for four years; these were vertical in distribution and lasted throughout the day. At first no source of anxiety was admitted. Physical examination having failed to account for the symptoms, and the type of headache strongly suggesting a psychogenic cause she was again asked if anything was worrying her. She then admitted that she had for a long time been very unhappy at home, because her father had always disliked her and singled her out for abuse and criticism. After talking about her affairs she admitted that the headaches were always worse after clashes with her father. This girl appeared to be sensible, was in steady employment demanding more than the average intelligence, and appeared quite capable of dealing with the ordinary difficulties of life. Three months later, though she still had occasional headaches of short duration, she was very much improved.

ANXIETY DUE TO UNSATISFACTORY SOCIAL LIFE

In no case in this group was unsatisfactory social activity the only factor to which the symptoms could be attributed. Unsatisfactory social life often depends to a great extent on an unsatisfactory home life, and 5 of the subjects included in the last group are also numbered in this. Neurotic patients are characteristically poor "mixers" because of their lack of confidence in themselves and inability to take a genuine interest in other people. It is therefore hard to say how far symptoms are due to lack of social opportunities or how far lack of social life depends on the neurotic personality. It was certainly probable that the unattractive manner and appearance of some subjects included in this group accounted to a great extent for their professed lack of interest in all forms of social activity, since in this way they avoided injury to their self-esteem. In 2 patients prolonged hours of work left them too tired and with too little time at the end of the day to take part in social activity. Loneliness was an important factor in the precipitation of symptoms in Case 3.

ANXIETY IN CONNEXION WITH ENGAGEMENT TO BE MARRIED

This appeared to be the precipitating factor in 11 cases. Illness of the fiancé, subconscious fear of marriage, and prolonged engagements were responsible in individual cases. In one case a woman, aged 31, was engaged to a man several years younger than herself, and this caused her considerable perturbation. In another, a woman of thirty-five had been engaged for some years with no date fixed for the wedding; in addition she disliked her employment as manageress of a laundry. In 3 cases there was antagonism between the patient and the fiancés' relatives, who disapproved of the match. In another instance a perverted friendship for another girl had led to the patient breaking off her engagement. Of the 11 patients in this group 10 were girls.

ANXIETY CONNECTED WITH MARRIED LIFE

This group consisted entirely of women. Unhappiness due to inconsiderate treatment by the husband, anxiety over family finances, unemployment of the husband, and sickness of the children are all recorded as emotional factors which have apparently precipitated symptoms. In 2 instances wives have been attempting to carry on with work which they had been doing before marriage, besides running their homes, until the strain became too much for them. Actual sexual maladjustment has not in my experience played an important part, but in such a small series of cases and in a somewhat superficial investigation of the present type its importance cannot be properly assessed. The following case is directly due to matrimonial discord.

CASE 6.—Q. R., aged 31, complained of constant weariness. A year previously she had been diagnosed as having neurasthenia following tonsillitis; at that time she felt weak, could not eat, and was very "nervy." A month before attending she had had a cold, with a productive cough and backache. Since then she had felt unwell and faint, her appetite had gone, and she had throbbing headaches. She also complained of generalised throbbing feelings, precordial pain and palpitations with trembling and twitching. She had had similar symptoms three months previously. Her husband was often out of work and in debt, and spent his money on his own amusement. He was completely inconsiderate and she had considered leaving him; but anxiety for the future of her four children prevented her. She had until recently been carrying on with her work as a treadle-machinist in addition to looking after her home. Examination showed no evidence of organic disease. She readily accepted the suggestion that her symptoms were due to her worries, possibly intensified by her recent cold. After staying at a convalescent home she felt much better, but three months later reported that she was irritable and depressed by her home worries.

ANXIETY DUE TO ILL HEALTH OR DEATH OF RELATIVES AND FRIENDS

Ill health of relatives may be the precipitating cause of neurosis for almost directly opposing reasons, which may even be both present together in the same patient. Thus anxiety for the welfare of a sick person to whom there are deep emotional ties may be directly responsible; parents may be worried over their sick children or wives over their husbands. On the other hand, the restriction of normal activities often necessitated by having to attend to an invalid relative is a not uncommon source of neurotic symptoms. The desire for a fuller life conflicts with the opposing duty of attending to the wants of the sick person. In 2 cases patients were also afraid of developing the conditions (insanity and heart disease) from which their parents were suffering at the time.

The death of relatives or near friends immediately preceded the precipitation of symptoms in 13 cases. In 4 the loss of one or both parents was responsible. In each case the ensuing insecurity was evidently an important factor. Of these 4 patients 3 were dependent individuals with very little initiative; the fourth was a child of 12, whose mother, the sole remaining parent, died suddenly in tragic circumstances. The death of husband or wife was responsible in 3 cases and of the fiancée in 1. In 2 the anxiety and strain of nursing relatives seemed to have precipitated symptoms after their death had occurred. The following examples are typical:—

CASE 7.—S. T., aged 23, complained of severe headaches. Recently these had been occurring two or three times weekly, and often caused her to faint. She also had palpitations and trembling sensations. The symptoms began soon after the death of her fiancé. On one occasion she developed symptoms while acting as bridesmaid to a friend. She also had severe symptoms while away on holiday; these developed on the day when she should have been married.

CASE 8.—U. V., aged 40, attended with jerky movements of head and hands. She had had similar symptoms as a girl of 15. She also complained of feeling exhausted after a quiet day, and had sudden feelings of panic. She had had these symptoms since her father's death eight months previously. She and her sister were entirely dependent on their father while he was alive, and were left with no money except what they could earn. The sister was at that

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time earning enough to keep them both. The patient sometimes taught music but disliked doing so. The feeling of insecurity in one who had never had to fend for herself was clear; moreover, by persisting with her symptoms she avoided doing work she disliked, and threw the whole burden of their maintenance upon her more normal sister. Six months later, in spite of psychotherapy at another institution, her symptoms were worse than ever.

Discussion

The incidence of neurosis in general medical practice, as determined by the present observations, is in fair agreement with other published figures. Reynolds (1930), engaged in the practice of internal medicine in Boston, U.S.A., diagnosed psychoneurosis in 200 (21 per cent.) of 935 unselected patients. Ziegler (1931) questioned 80 general practitioners in New York and obtained from them an average figure of 20 per cent. Moersch (1932) reported a psychogenic factor in 44 per cent. of 500 patients, but in 32 per cent. a predominating organic condition was also present. Halliday (1935) reported that 33 per cent. of 1000 consecutively examined insurance patients, who had been specially referred to him in his capacity as medical referee, were cases of psychoneurosis. These were patients with chronic illness, about whose fitness for work their usual medical attendant was in doubt, and such a method of selection naturally favours a high incidence of neurotic illness.

Little is known of the primary causes of neurosis. It is recognised that both extrinsic (environmental) factors and intrinsic factors play a part. How much the neurotic type of reaction is determined by events in early life, and how far it is innate in the personality, is beyond the scope of this paper to inquire. It is clear, however, from even a superficial study, that the relative importance of extrinsic and intrinsic factors varies widely.

In the majority it was not difficult to decide whether the environmental or personality factor predominated. Cases of the former type have been called by some "situation neuroses"; but this term, I think, separates them too sharply from the "character" neuroses and suggests that these are distinct clinical entities, rather than cases at one end or the other of the same scale. The basic mechanism of causation is probably essentially the same in both groups. I have preferred to speak of major and minor neuroses to indicate the extreme types. Such a subdivision envisages the possibility of the minor neurosis developing into a major neurosis, and yet is useful since the prognosis is very different for the two groups. Some differentiation on a prognostic basis is of value since it is clearly impossible, as well as unnecessary, for all patients with psychoneurotic symptoms to receive treatment at the hands of a full-time psychiatrist.

MINOR NEUROSIS AND MAJOR NEUROSIS

The person suffering from a minor neurosis may be compared to one who has become intoxicated under exceptional circumstances, and the person with a major neurosis to the chronic alcoholic. In the former group the immediate source of anxiety is usually readily discovered, and the patient is able and willing to discuss it frankly; he usually readily recognises the causal connexion between such mental anxiety and the development of his symptoms, when the possibility has been suggested to him. The environmental factor is, as a rule, a potent one. The personal history may reveal little that is abnormal. School life, the difficulties associated with puberty and young adult life have usually been successfully encountered. A reasonable degree of resourcefulness had often been shown in overcoming minor difficulties. They are normally sociable people, capable of taking an interest in other people, and having interests of their own outside themselves. Such cases appear to have been overwhelmed by some severe emotional disturbance, which may either have been a sudden crisis or a long-standing source of distress that has eventually overcome the patient's resistance. Nevertheless it is highly improbable that such symptoms would have developed unless there was also the innate instability of temperament seen more strikingly in the next group. Cases 2, 3, 5, and 6 are of this minor type.

Among cases of major neurosis the personal history reveals that the patient has been abnormal in his social relationships and in his reactions to difficulties from an early age. Often solitary at school, he is a poor "mixer," avoiding social activities, largely from a fear of failing to achieve success. There is often a history of tics, enuresis, or night terrors in childhood, and of nervous breakdowns at other difficult periods of life. Minor difficulties such as would be dealt with in the course of everyday life by normal people are often sufficient to precipitate symptoms in these unstable subjects. Often poorly developed physically, they are solitary, uncongenial, nervous, and socially maladjusted; sensitive, compulsively over-conscientious, they are constantly aware of a feeling of inadequacy, and hence insecurity.

To the latter group belong those cases whose symptoms were attributed to "constitutional inferiority," among whom environmental factors were of little importance. Again those with morbid fear of disease were usually of this type. In a few cases, however, such a fear could be traced to some reasonable source and appeared to be an isolated event in an otherwise normal life. An example of this type is the patient whose symptoms dated from an attack of acute nephritis, and similar cases are not uncommonly met with among medical students, in whom a neurotic fear of disease may develop in the course of their training—the result of a little knowledge. Rapid recovery on reassurance is here the rule.

Those with symptoms dating from a shock or minor injury were also mostly inadequate individuals, the nature of the precipitating trauma being such that it would have been a passing cause of discomfort or distress in normal people. In this group particularly, but also doubtless among the remaining cases, it is probable that the apparent preventive cause is not the real one, and may act by uncovering a deeper and older complex. Among those whose symptoms were related to their work was an almost equal number of chronically dissatisfied inadequate people, who would have been incapable of success in any sphere, and those whom fortune had treated with more than common disfavour. Among the remaining groups, cases of minor neurosis predominated, but instances of intractable neurosis were encountered in every group.

TREATMENT

Although it has been impossible to treat more than a small number of these cases, it is evident that the prognosis differs widely in these two groups of cases.

The minor neuroses as a whole respond well to simple psychotherapeutic measures. A relatively brief inquiry into the patient's state of mind, during which he is encouraged to do most of the talking; a definite diagnosis with a simple explanation of the interaction of mind and body; and confident reassurance as to the absence of underlying physical disease

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—these often suffice to give the patient some insight into his condition and may completely relieve him of his symptoms. Occasional further visits often help to establish the recovery more firmly. Of 16 cases of major neuroses, 10 of which had had previous breakdowns, and 6 of which had had persistent symptoms for a number of years, only 1 was free from symptoms six months after being first seen, 4 were improved, and 11 as when first seen or with fresh symptoms. Of 13 cases of minor neurosis, 5 were well and 4 much improved when seen again several months after the last attendance. In those who were not improved the precipitating cause was still persisting as a source of anxiety.

Such experience as I have had therefore confirms the view that whereas treatment of the patient with chronic symptoms of neurosis is relatively unsatisfactory, and requires prolonged treatment by trained psychotherapists, the simpler forms of neurosis associated with severe environmental precipitating factors often respond well to simple treatment. It may be argued that such patients would respond equally well to a sedative mixture and strong reassurance; but while this may be true for some cases, it is difficult not to believe that by giving these patients some insight into their condition one enables them to face reality more courageously, and with more hope of preventing recurrences. That in some cases such insight gives immediate relief from symptoms and some peace of mind is unquestionable, but that the effect of such treatment is more than temporary, no evidence can be offered at present. Persistence of the source of anxiety is naturally a hindrance to recovery, but in an intelligent patient complete recovery may take place in spite of it. On the other hand the patient can sometimes be advised to take steps that will modify or dispel such a source of anxiety; and here recovery may be speedy, though sometimes without much insight.

In hysterical conditions, dramatic cures may be brought about by forcible suggestion, though the patient has no insight at all into the cause of the condition. Such a case was that of a girl of 21 who had been unable to use her left arm since she had dislocated her wrist eighteen months previously. The reason for this hysterical persistence of loss of function was not discovered, but by insisting that she could use it quite well if she only made the effort, full power and movement returned immediately and no relapse has occurred two months later.

Summary

(1) Of 1300 patients referred to general medical out-patients of Guy's Hospital 16 per cent. were diagnosed as cases of psychoneurosis.

(2) The incidence of psychoneurosis was highest between the ages of 15 and 30 in both sexes.

(3) Nearly twice as many women were affected as men.

(4) The sources of anxiety responsible for the precipitation of symptoms have been analysed, and examples given.

(5) Many cases of neurosis of a mild type respond well to simple therapeutic measures.

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MEDICINE AND THE LAW

Aphasia and Testamentary Capacity

IN the February *Practitioner* Dr. Macdonald Critchley writes discerningly on the testamentary competence of a patient suffering from aphasia. Since the classical papers by du Saulle in 1882 and by Byrom Bramwell in 1897, fresh progress has been made in the study of a disorder which is often not an isolated phenomenon but may be accompanied by definite change in mentality and conduct. Even the layman can appreciate that aphasia complicates the task of assessing the state of intelligence. The medical man may be asked to give his opinion whether the patient on some date in the past fully understood, or to-day fully understands, both printed and spoken words. If the patient has this complete understanding, his answers "Yes" or "No" to questions may not be conclusive; he may mean the one and say the other; gesture—e.g., the vigorous nodding of the head—will be a safer guide. In his discussion of various aspects of the problem Dr. Critchley naturally mentions the case of Moore *v.* Moore which came before Sir Francis Jeune in 1900. Arthur John Moore, M.P. for Londonderry City, propounded the will of his deceased sister. She had a paralytic stroke in July, 1898, and was left a victim to aphasia. Her doctor advised her that she ought to make her will, and she thereupon sent for her solicitor. She had lost the power of coining her thoughts into words, but her medical and legal advisers hit upon a simple plan for ascertaining her wishes. They prepared two packs of cards, one containing the names of her various properties and possessions, the other containing the names of her relatives. The patient "dealt and sorted her cards" and the plan succeeded admirably. The solicitor played the card, for instance, of her Ballycoby estate, and she played on it the name of the relative whom she desired to inherit it. The solicitor then "turned the trick." Play proceeded until all the property was allotted. There were two difficulties. First, the arrangement did not provide for her leaving anything to a charity or to a friend whose name was not in the pack. Secondly, she had to choose an executor and, at the first attempt, she rejected all the candidates whose names were in her hand. Other names were written on cards, but she was still dissatisfied. Finally, she threw down the card with the name of her brother, Arthur John Moore. A will was at once drawn up and she was taken to have approved the results of the card-play and the choice of the executor, inasmuch as she next day executed the will after it had been read over to her. The president of the court said the case was novel and ingenious; no more fair or skilful method could have been devised. He pronounced in favour of the will. To anyone reading the report of the case to-day it all sounds easy. Perhaps the medical practitioner cannot expect always to find so entertaining a solution.

IRELAND

(FROM OUR OWN CORRESPONDENT)

CONDITIONS IN THE DISPENSARY MEDICAL SERVICE

THE Irish Medical Union has lately drawn public attention to the grievance under which medical officers of the dispensary medical service suffer in the inadequacy of the salaries in relation to modern conditions. The council of the Union has an addi-

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tional grievance in the refusal of the Minister for Local Government and Public Health to receive a deputation to discuss the matter. It is pointed out that although they are classed and paid as part-time officers many of the dispensary doctors are in fact whole time, as they are on duty day and night, and in some cases the work is so continuous as to leave no time for private practice. It is noted that in recent years private practice, especially in the country, has become less remunerative, and many patients of the farmer class who formerly got attendance as private patients now claim it on "the dispensary ticket." The council of the Union draws attention to the increased cost of living, the decrease in private practice, and the increased expense of medical education as reasons why salaries should be revised. It is also pointed out that whereas the salaries of whole-time officers are supplemented by a "cost of living bonus," the salaries of dispensary medical officers are not so supplemented. It is remarkable that even in cases where the local authorities recognise the justice of their medical officers' claims and are willing to grant increases of salary the Department of Local Government and Public Health refuses to sanction the increases.

While the Medical Union is pressing its case for improved salaries it has happened that both in Dublin and Cork proposals have been put forward by members of the local authorities for the substitution of whole-time for part-time dispensary medical officers. The case of Dublin and Cork is different in many respects from that of the smaller towns and the rural areas. In the cities the duties are so exacting that the doctor has little or no time left for private practice and is dependent entirely on his salary for his livelihood. One medical officer in Dublin complained to the board that in a busy time he was called on to make between thirty and fifty new visits each day after his dispensary hours, and he could only finish his rounds by working till midnight. Such a number of new visits means probably twice or three times as many actual visits as each patient has to be attended until his illness is at an end. It is doubtful whether the solution of the present difficulty lies in the appointment of whole-time medical officers, but there is no doubt that there is need for a greatly increased number of dispensary medical officers in both Dublin and Cork. The position of whole-time dispensary doctors would hardly attract men of high attainments or ambition, while on the other hand the manner in which a competent practitioner performs his public duties is often his best introduction to successful private practice. In the country districts there is no doubt that the prospect of a reasonable amount of private practice is what attracts many men to the dispensary service.

HOSPITAL CONVERSATIONS IN LONDON

It will be recalled that the commission appointed by the British Hospitals Association, under the chairmanship of Lord Sankey, recommended the formation in each region of a voluntary hospitals regional council to correlate hospital work and needs in that region. The regional committee for the county of London is our old friend the Voluntary Hospitals Committee, which meets regularly on the first Wednesday in the month except during the summer holidays and sends a précis of its proceedings to all the constituent hospitals. It is now proposed to extend the area covered by this committee to correspond with that of the King's Fund, which will bring in 42 additional hospitals and nearly 3000 additional beds. The report for the year 1937 now before us contains two up-to-date maps of hospital accommodation in London, one showing the general hospitals, the other the special hospitals, distinguishing by colour alone which are under voluntary and which under municipal control. Including under L.C.C. beds only those actually used for sick persons their number is given at 35,393, compared with the 16,113 voluntary hospital beds—a figure including those in recovery and convalescent homes.

The King's Fund now requires all voluntary hospitals within the county to consult the regional committee about any proposed extension which will produce an important change in the amount, nature, total annual cost, or site of work done for in- or out-patients. This arrangement does not cover reconstruction, but the committee hopes that will not stand in the way of the same courtesy being extended in regard to new work. The decision of the London Fever Hospital to erect at once a modern isolation block was only taken after such consultation.

The scheme for admission of emergency and acute cases is now becoming a practical proposition. The proposal is that a record should be kept, at a central office, of beds available for such cases, and that doctors should be encouraged to telephone to this office when urgently wanting a bed. Before the central office can be established it has proved necessary to ensure that the admission of such cases at each hospital is controlled there by only one office, and the hospitals have been asked to see that this is done. There is little doubt, the report suggests, that such a central office would materially improve the relations between the hospitals and the public by assisting the medical practitioner to accommodate without delay a case which needs immediate hospital treatment and by saving the hospital the necessity of finding the house surgeon on duty. Another practical difficulty will be solved if the L.C.C. is willing to grant the same ambulance facilities for admission to voluntary hospitals as are available to council hospitals.

An outstanding issue on which the committee hope soon to be in a position to report is the provision of provident schemes in relation to hospital pay-beds in London.

LORD HORDER ON RAY TREATMENT.—At the opening by the Princess Royal of the extension of the Institute of Ray Therapy on Feb. 5th, Lord Horder, president of the Institute, said it was often asked what was the need for such an institution. Limited as they are by space and funds, the general hospitals' first concern must be with maladies which gravely menace life. Ray and electrical treatment can be provided more economically in every way at non-resident institutions. The coming of National Health Insurance drew attention to the lack of provision for minor ailments, which, though not serious, have an important effect on industry. The large increase in road accidents meant that hospitals could only provide for cases which were immobilised and in need of surgical attention. Panel doctors had neither the time nor the facilities for the after-treatment of these cases, and there was a gap between their discharge from hospital and their return to work when they received very inadequate attention. The Institute, said Lord Horder, fills this gap and provides the most modern methods for reducing the period of incapacity after accidents and for preventing minor ailments from becoming major.

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PANEL AND CONTRACT PRACTICE

The February Health Campaign

A CIRCULAR issued by the London Public Medical Service draws attention to the fact that the February stage in the Health Campaign is intended "to encourage a wider use of the facilities available for adults and adolescents, in particular those relating to diagnosis and treatment of tuberculosis and venereal diseases . . . in both cases the objective is to encourage individuals to assist in finding out these diseases in the earliest stages and to take medical advice from the very beginning, from their own doctor, from the dispensaries and clinics of local authorities, and from the hospitals." The order in which the various means of obtaining medical advice are enumerated is significant. It is the family doctor who can direct his patients where he thinks they will receive adequate treatment, and—what is of vital importance—he can keep his eye on possible family contacts. In no part of his practice is the practitioner's tact and personal knowledge more essential. When referring a patient to the tuberculosis officer or to the V.D. clinic the practitioner is counselled by the L.P.M.S. always to send with him a note to the medical officer, and for two reasons: to demonstrate his desire to help the routine of the clinic, and at the same time to maintain his status as the family doctor. For reference to hospital a convenient form of hospital letter is available.

The L.P.M.S. takes this opportunity of urging members of the service to examine carefully all cases where there is a suspicion of tubercle. Insurance committees, London among them, have been worried by the large proportion of tuberculous cases which are not notified until an advanced stage of the disease has been reached. It is no doubt true that many of these have left it very late before consulting a doctor, but there is a suspicion that other cases are not diagnosed and reported as early as they might be. This has led to the practice in some quarters for health visitors to urge every person whom they hear coughing to see the tuberculosis officer, whether there is a doctor in attendance or not. The practice may be justifiable when the patient has no doctor and cannot (or will not) afford to get one, but it is quite unjustifiable when a doctor is available, as he is to L.P.M.S. subscribers and of course to all insured persons. It then strikes at the very root of the proper relation between patient and doctor. The health visitor should tell the patient (and be able to tell him with confidence) that his doctor will send him to the tuberculosis officer if necessary.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A HOSPITAL PHYSICIAN

III

IF the "voluntary" hospitals vary in efficiency, so (and more also) do those financed out of public funds. And without exception these suffer from disabilities peculiar to their development and administration.

The Local Government Act of 1929 transferred to the public health authority for the county or city all the institutions previously governed by the poor-law guardians, and for convenience sake it was accepted that the medical officer of health for the district should be the final executive authority, responsible to the elected councils for their conduct and coördination. There are four main types of hospital—i.e., general (covering the same field as most of the voluntary hospitals), mental, infectious, and those for the aged and incurable. Each institution has its own medical superintendent, who may or may not do some clinical work but whose chief function is administration. Upon the energy, intelligence, and integrity of this officer, and of the medical officer of health, depend the efficiency of the hospital and its coöperation with other institutions and with general practitioners. A good man sometimes makes, and a feeble one always mars, the whole system, which is highly authoritarian despite its democratic origins. In most other civil organisations—the business firm, the university, the school—there are public meetings of heads of departments and representatives of sectional interests to discuss problems arising in work, to collect information, to propose improvements, and to voice grievances. In the municipal hospital there are no such meetings. Criticism of administration or organisation is never invited and is almost always resented.

The medical superintendent of such a hospital lacks the daily experience of medical practice and daily contact with patients and their friends, nurses, porters, technicians, and all the different people who go to make a hospital population, to inform and guide him. He may, in fact, have never had such experience. It is a common fallacy to suppose that there are people, a species of super-men, who are born administrators, who can be relied upon for efficient organisation, and who are worth their weight in gold. The "born administrator" is a myth. Patient study and long experience, with constant invitations to criticise, may make a person into a tolerably good administrator provided he is not incapacitated by an overestimate of his qualities, but the only safe guide for local administration as for national government is the consent of the governed. The need for "taking opinion" is important also for new appointments, and the common practice of universities in this respect is a sound one—i.e., recommendation by a committee of office-holders of the same standing, with appointment by an independent body. Nepotism of some sort or other is almost inevitable, but it can at least be minimised by some such procedure.

The subcommittees of the councils, which are nominally responsible for government, are rarely well-informed, and often lack even the active interest that might make them so; they are preponderatingly cautious in outlook; they tend to accept at its face value the report of a complacent official or to

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underestimate the importance of changes proposed by a progressive one.

* * *

Criticism and a moderate degree of publicity are the only guarantees of efficiency. An authoritarian administration is rarely efficient; it disregards the need for the constant expression of experience among its units, and leads inevitably to dissensions and cliques. Lack of opportunity for discussions and criticism allows personal antipathy to influence judgment and favours tolerance of the second best—tolerance even for real evils when their removal requires the coöperation of others, and this is denied.

At the best, the work of doctors and nurses, profoundly interesting as it is, is haunted by the fear of inadequacy in what is constantly a struggle between life and death, and by its constant personal contact is fatiguing to a degree probably only equalled, in regular occupation, by teaching. The knowledge that the struggle is prejudiced by removable obstacles, even though these be seemingly trivial, is worse than disheartening. It produces—especially under conditions of stress, as in an epidemic or when an exceptional number of critical cases form a heavy weight of responsibility—an irritation and underlying sense of irresponsibility which is prejudicial to proper judgment and to the detachment on which a vital decision may depend.

* * *

The obstacles to good work, however, are often even more serious. It seems that committees do not realise that the incidence of sickness, and therefore the numbers of persons needing hospital treatment, is not constant; or, if they do know this, they base their calculations on an average or even a minimum figure. The consequence is that few municipal hospitals avoid the danger of serious overcrowding from time to time, and they are apt to give their staffs an amount of work that seems ludicrous when compared with work demanded in a voluntary hospital.

The comparison cannot be a strict one, since with few exceptions the municipal hospital's medical staff is composed of experienced men and women who have no other obligations, whereas the voluntary hospital staff is composed partly of specialists who spend only a small proportion of their working hours in the hospital, and partly of junior residents. Nevertheless a general impression may be obtained from the following Table contrasting the medical staffs of voluntary and municipal general hospitals.

One must credit the voluntary hospital also with its student clerks, by whom the labour of record-keeping is largely undertaken. The physicians and surgeons of the municipal hospital, for the most part unassisted by juniors, are forced to spend much of their time attending to simple but necessary procedures that are carried out by the junior residents of a voluntary hospital, and to emergencies that are a constant interruption to orderly consecutive effort. They are, in fact, specialist, registrar, and house-officer combined. To conscientious medical officers in a municipal hospital life is anything but a bed of roses! It is to their credit, and an indication of the type of men and women now attracted to a salaried appointment, that the general level of work performed compares very well with that of voluntary hospitals of comparable size, and that some original work is achieved—in small but increasing amount.

HOSPITAL STAFFS AND WORK

(Figures taken from the "Hospitals Year Book" for 1935)

—	Beds (approx.).	New in-patients (approx.).	Out-patients (individuals) (approx.).	Medical.		Nurses.	Beds per unit of staff.	
				Honorary.	Resident or salaried.		Doctors.	Nurses.
V. 1	640	12,000	100,000	56	41	401	6·5	1·6
2	840	14,000	100,000	61	46	553	7·8	1·5
3	315	5,500	33,000	29	14	135	7·3	2·3
4	325	6,000	60,000	38	12	157	6·5	2·0
L.C.C. 1	1,300	8,500	2,000	..	11	300	118·0	4·3
2	800	8,000	4,000	..	8	250	100·0	3·2
3	800	7,000	13,000	..	8	254	100·0	3·1
P.M. 1	1,200	13,600	—*	..	9	346	133·0	3·5
2	520	10,000	12,000	..	16	248	32·0	2·1

* No figure available.

V. = Voluntary. L.C.C. = London County Council. P.M. = Provincial municipal.
V. 1 = London teaching hospital—St. Thomas's.
2 = " " The London Hospital.
3 = Provincial teaching hospital—The Queen's Hospital, Birmingham.
4 = London non-teaching hospital—Royal Northern Hospital.
L.C.C. 1 = Lambeth Hospital. 2 = St. Giles' Hospital. 3 = Hackney Hospital. (Some visits from part-time consultants.)
P.M. 1 = Withington Hospital, Manchester (some visits from part-time consultants).
2 = Selly Oak Hospital, Birmingham (the medical staff also serve an infirmary for the chronic sick, 636 beds).

* * *

State medicine and municipal medicine are words that often conjure up a vision of a semi-military organisation (admirable for those who like military drill, detestable to those who treasure their scientific and professional independence) in which the doctors are at the beck and call of a bureaucracy, robbed of initiative, and performing stereotyped work in an atmosphere of oppressive regulation.

Unquestionably such a nightmare is a possibility. In existing services the tendency to authoritarian organisation is already strong enough to show the extreme importance of individual freedom of action, according to professional ethics, and of the fullest self-government compatible with efficient team-work. With its vast influence the medical profession, turning from internal dissensions which thwart creative action, could establish an example of organisation for service on a democratic basis which would provide guarantees both against sectional domination at the expense of the public good, and against the subjection of the profession to bureaucratic rule.

Given a progressive rather than an over-cautious Ministry of Health the organisation of both preventive and remedial medicine on a regional basis, with only supervisory functions exercised centrally, has much to recommend it. It permits of competition in efficiency and can, with care, avoid many of the pitfalls of bureaucracy. Sudden upheavals are not to be desired, and it is by the relatively rapid development of municipal hospitals and clinics (in an association with voluntary hospitals so close as rapidly to obliterate competition and jealousy) rather than by any sweeping legislation which could force unwilling private practitioners into line, that reform must come. Little or no fresh legislation is in fact needed,

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since the law already permits local authorities to develop their services in any direction that seems necessary.

Each municipality now has opportunity, under statute, to develop its medical services to any extent its council considers desirable. The payment of grants from the national exchequer is subject to the general approval of the Minister of Health, whose inspectors from time to time visit the hospitals; but the Ministry rarely acts as a definite obstruction. Yet so far there is scarcely any local authority that can congratulate itself on having used its powers in such a way as to provide the public with a service which is even reasonably complete.

A progressive authority is at present only hindered by the possible reluctance of the Ministry to contribute to cost, and by the fear of antagonising too bitterly the interests behind private and "voluntary" practice. In so far as these interests are legitimate, it is of course highly necessary to safeguard them, but there can be no doubt that they are in most quarters regarded with too great tenderness, and the "consultant" services with which so many of the newly organised municipal general hospitals are now being provided, consisting in occasional visits from private specialists with a roving commission, are quite different from anything which the older "voluntary" hospitals themselves have instituted, and far less effective. In the present stage of development, the obvious and safe departure is the institution of both full-time and part-time specialist services on exactly the same footing as regards status, responsibility, and their close association through joint advisory councils representing both types of appointment and both municipal and "voluntary" hospital.

CORRESPONDENCE

DISPENSING BY DOCTORS

To the Editor of THE LANCET

SIR,—Having been a regular reader of THE LANCET over a very long period I have observed, with no little pleasure, the sympathetic references you admit to your columns concerning the activities of the profession of pharmacy, to which I belong. I call it a profession although—because of circumstances to which I propose, if you will allow me, to call attention in this letter—an overwhelming proportion of the members of the confraternity is compelled by the need of making both ends meet to engage in a miscellany of retail trades, some of which have but the remotest relationship to the work the pharmacist is trained and educated to do. It is indeed doubtful whether there is any kind of shop where the stock is composed of so many articles which Diogenes could do without as is the chemist's shop. It is sad to reflect on this; to a new generation of pharmacists, required to pass examinations infinitely more exacting than those now of middle age had to pass, it is galling. The regulations require matriculation, two years' academic work, and an apprenticeship of at least a like period; and I sometimes wonder whether I have the moral right to call myself a "chemist and druggist," since the tests now applied to aspirants for that title are far above my head. No wonder that of late there has been a sharp fall in the number of students registered by the Pharmaceutical Society; the work is hard and the outlay in money considerable, for "neither Charon nor Pluto will do anything for naught." And the prizes are few.

A chemist's trade paper, in commenting upon the situation in a recent editorial article, said "the standard of education has raised the pharmacist far beyond the level of ordinary distributors, and the tragedy of it is that he is trained to practise a profession which at the present time cannot offer him anything but the most meagre reward." That is a melancholy statement and, with deference to the capable editor of the paper in which it appears, there is a hopeless sound about it which does not help those who are trying to make faint hearts grow stronger and send new warriors to the campaign. Not many years ago there was in Great Britain one chemist's shop to every 3000 of the population; to-day it is estimated that there is one to every 2000, and, since there is no reason to suppose that the demand for medicine is 30 per cent. greater than it was a few years back, it is clear that the average volume of the turnover of drugs in each pharmacy is conspicuously less than it was; but whether or not the public is better served by the present or the past ratio of shops to population are questions open to discussion. Other things being equal, it follows that the average practising pharmacist is more lucratively engaged when he has 3000 potential customers than when he has 2000, but there is no ground for assuming that the one in 2000 ratio is the ideal one, and it is certainly not established either by precedent or by any recognised law of supply and demand. In a few countries—Italy is a notable example—the number of pharmacies to population is limited by statute; but in the present conditions of practice in this country limitation by ordinance is not within the scope of practical politics, since there is no limit to the classes of goods which the owner of a chemist's shop may sell and no limit to the classes of shopkeeper who may lawfully sell everything the chemist sells with the exception of scheduled poisons. In Italy, where a limitation is placed on the number of pharmacies, there are limits imposed by usage, as unbreakable as those enforceable by the law of the land, on the types of retail transactions which are allowable to the pharmacist and to the shopkeeper respectively. Further—and this brings me to a point which, to my mind, is of supreme importance—in countries in which machinery exists for the limitation of pharmacies and in which custom dictates that pharmacists shall refrain from ulterior trading practices, doctors, save in exceptional cases, are forbidden to dispense medicines. Thus a comparison between pharmacy in certain continental countries and pharmacy in Great Britain is of little service since the conditions are so widely different. As long as I can remember, it has been a grievance of the pharmacist that much of the work for which he is specially trained is kept from him because many doctors dispense their own prescriptions. At times the chemists have been loud in their protests against this practice and, if I may say so, not without just cause. When I was in practice as a pharmacist I thought the competition was unfair and even now in the mellowness of retirement, and merely an onlooker, I still think that the cobbler should stick to his last, as far as possible. The chemist would be glad enough to stick to his trade if he could make a living at it; but if the doctor supplies medicines to his patients, the chemist is obliged to dabble in all sorts of gew-gaws in order to keep a roof over his head.

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Fortunately there is plenty of evidence that dispensing by doctors is a steadily dwindling custom. It began to dwindle when the National Health Insurance Act came into force, and now, when something like fifteen million prescriptions are dispensed each year by panel chemists, doctors have become so accustomed to writing prescriptions for their panel patients that there is a distinct tendency on the part of those practitioners who formerly supplied medicines for their private patients to write prescriptions for them also. When, as seems likely to happen in due course, the benefits of the health insurance scheme are extended to the dependants of insured persons, there will be such a vast increase in prescription-writing that I doubt whether it will be worth while for many doctors to continue to keep an assortment of drugs for the use of patients who are not on the panel. Obviously, whatever happens, there must be no interference with the right of the doctor to supply medicine in cases of emergency and in out-of-the-way districts, and for my own part I do not think any law to compel medical practitioners to write prescriptions will be necessary: *solvitur ambulando*. It would be ungracious on my part, having asked for the hospitality of your columns, to suggest that the tendency on the part of the medical profession to discontinue the supply of medicines to their patients is wholly due to an accidental cause; by no means do I wish to infer any such thing, for I am strongly of opinion that the tendency had already begun before Mr. Lloyd George conceived his plan. The higher education of the pharmacist was beginning to tell long before 1908 and the medical profession had already perceived that a body of trustworthy and skilled men was available for the compounding of medicines.

The falling-off in student registration, to which I have alluded, is doubtless but a temporary phase, for the pendulum is always swinging. A new generation of pharmacists is coming along which is being taught that there are higher things than trade; they are being equipped with knowledge far in advance of that which former generations acquired and are becoming proficient in laboratory technique of a kind which will enable them to be the true handmaids of medicine; they will be able to help medical practitioners in many ways and medical practitioners can help them by ceasing to dispense medicines. The Pharmaceutical Society has been criticised because of the elaborate nature of the pharmaceutical curriculum; my prophecy is that in years to come the society will be praised for the prevision of those who have remodelled its educational policy.

I am, Sir, yours faithfully,

London, Feb. 5th. COBBLER.

DYSENTERY AND METADYSENTERY BACILLI

To the Editor of THE LANCET

SIR,—With reference to the interesting paper on Sonne's Enteritis by Drs. L. H. D. Thornton and E. M. Darmady, published in your issue of Jan. 1st, I should like to be permitted to make the following remarks.

(1) The organism known as "Sonne's bacillus" was described by Sonne in 1915. It is identical with *B. ceylonensis-A* described by me in January, 1907, and with *B. pseudodysenteriæ-E*, described by Kruse a little later in the same year. The identity of these three organisms has been demonstrated by Prof. C. F. Cerruti, chiefly by serological methods, using the original strains (*J. trop. Med. Hyg.* 1930, **33**, 207). According to the rules of nomenclature, the correct specific term for the organism is *ceylonensis-A*.

(2) Two closely allied organisms, slightly different in their biochemical reactions and completely different serologically, are *B. ceylonensis-B* (Castellani 1907) and *B. madampensis* (Castellani 1911). They form, with *B. ceylonensis-A*, the chief pathogenic species of a group of intestinal bacteria which I have named "metadysentery bacilli" and for which Cerruti has created the genus *Castellanus* Cerruti, 1930. These organisms, similarly to the organisms of the true dysentery group, or genus *Shigella* (*S. dysenteriæ* Shiga-Kruse; *S. paradysenteriæ* Collins, var. Flexneri; *S. paradysenteriæ* Collins, var. Hissi-Russelli), do not produce gas in any carbohydrate, but in contrast to them produce acidity in lactose and clot milk, although the acidification of lactose and the coagulation of milk may be very slow. The organisms of the metadysentery group are, I venture to think, of great practical interest, as they may cause very diverse clinical conditions. They are capable of causing dysentery, but may cause also a number of non-dysenteric syndromes, among which I may mention (*a*) an extremely chronic, almost symptomless colitis, which I have repeatedly described with the name of chronic metadysentery (a paper of mine on this condition was published in THE LANCET, 1929, **2**, 370); (*b*) obscure prolonged low intestinal fevers without diarrhœa; (*c*) subacute cases of fever with diarrhœa (non-dysenteric), which have been at times confused with paratyphoid. *B. ceylonensis-A* and *B-ceylonensis-B* were, in fact, first isolated from cases of this nature in Ceylon (*J. Hyg., Camb.*, January, 1907); (*d*) cystitis (Castellani and Mackenzie Douglas, *J. trop. Med. Hyg.* 1932, **35**, 337).

It must be noted that the group of anaerogenic intestinal bacilli, called by me metadysentery group, in addition to the pathogenic species above mentioned, contain non-pathogenic species, or species the pathogenicity of which has not been proved—e.g., *B. pyogenes Migula*, 1900 (=*B. pyogenes fœtidus* Passet, 1885); *B. colianaerogenes* Lembke, 1896; *B. gintotensis* Castellani, 1910; *B. bentotensis* Castellani, 1911.

I shall be glad to supply workers interested in the subject with the original strains of *B. ceylonensis-A*, *B. ceylonensis-B*, and *B. madampensis*.

I am, Sir, yours faithfully,

ALDO CASTELLANI OF CHISIMAIO.

New Orleans, Jan. 26th.

PROGNOSIS OF SCHIZOPHRENIA

To the Editor of THE LANCET

SIR,—Last week's leading article and Dr. Pullar Strecker's able assessment of the insulin and Cardiazol treatments provoke comment. No investigator has denied that the modern treatments of schizophrenia are followed by improvement in a large number of cases. Two points are controversial:

1. Whether all forms of treatment are not equally successful.

2. Which forms of schizophrenia respond to treatment.

(1) This point may be stated, "Is there not a common factor in all successful treatments?" We believe that there is. In all of them the patient is made to feel—to react to an environmental stimulus, to know reality. We would cite the removal of septic foci; pyrotherapy; hormonal therapy; altered states of consciousness with narcotics such as somnifaine, sodium Amytal; insulin; cardiazol; occupational therapy; psychotherapy. In all of these

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treatments the psychosis is prevented from remaining an effortless equilibrium. Insulin and cardiazol offer a pre-eminently potent means of disturbing the psychosis as often as may be necessary. Their value is therefore incontestible, even if at a later date it be proven that their effect is not specific.

(2) The cases which do best are those in which there is still some reaction against the psychosis, in which there is not yet utter unremitting apathy. The more florid the psychosis, the better the outlook. Good results are sometimes obtained in apparently demented cases of some years' standing. These cases during treatment gradually uncover a psychopathological picture showing delusional and hallucinatory material which had been conscious originally and which was still attaining expression in the mannerisms, attitudes, and behaviour generally of the so-called dement.

We speak from an experience of sixty insulin and forty cardiazol cases treated in the male and female wards of this hospital since October, 1936. We are convinced that, whatever the rationale may be, more remissions are procured with these treatments than are ordinarily observed, and that these treatments should be available in every mental hospital.

We are, Sir, yours faithfully,

EDWARD LARKIN,
HUNTER GILLIES.

West Ham Mental Hospital, Feb. 13th.

CONTRACEPTION AND FERTILITY

To the Editor of THE LANCET

SIR,—The medical subcommittee of the National Birth Control Association has ventured to contest Mr. Green-Armytage's statement that contraceptive measures in the early days of marriage are inimical to pregnancy at a later date, and has declared its inability to find evidence in support of his statement. May I assist this subcommittee?

In the gynæcological and obstetrical monograph "Sterility and Conception" by Gardner Child (1931), it is stated on p. 89 that "where artificial means are used to prevent conception and are indulged in for any length of time they are quite liable to create a habit of sterility." In the *Transactions of the Medical Society of London* (1936, **59**, 120) Mr. Lane-Roberts says that "at times the endocervical secretion becomes hostile to spermatozoa because of the mechanical viscosity resulting from either poor cervical drainage or an endocervicitis," and on p. 130 he adds: "to take at random some infertility factors found in one series of one hundred cases, in the woman, in 28 per cent. endocervicitis was the factor." James Young, in the third edition of his gynæcology text-book (1933), states that chronic endocervicitis is a cause of sterility of uncertain importance; "it may prevent insemination by leading to an inflammatory blockage of the canal or by producing discharges which are hostile to the spermatozoa." Beckwith Whitehouse, in the fourth edition of Eden and Lockyer's book, writes: "There can be little doubt that the lesion (erosion), accompanied as it is with alteration in the amount and character of the cervical secretion, is a cause of diminished fertility."

It can hardly be disputed that the practice of contraception, with all its mechanical, chemical, and infective possibilities, is capable of causing chronic changes in the cervix uteri. Contraception involves finger insertion and handkerchief contamination must sometimes occur. The cervical canal is the Dardanelles of the genital tract, and any alteration in its state is inevitably brought to bear on the sperm attempting to win entrance.

One is led to wonder whether the National Birth Control Association, which can so lightly dismiss the expressed opinion of an experienced gynæcologist, has sufficient title to its discriminating function.

I am, Sir, yours faithfully,

GEORGE H. ALABASTER.

Welbeck-street, W., Feb. 14th.

To the Editor of THE LANCET

SIR,—When the secretary of the National Birth Control Association submitted her apologia in your last issue she picked out one line of a verbatim report and neglected to refer to the answer which I courteously supplied when she wrote to me on Jan. 25th. In equity I am enclosing for publication a copy of my letter to her which explains the reasons for the opinion held, with which many will agree, including an eminent gynæcologist who was present at the meeting and was also one of the official speakers.

The views of the medical subcommittee are not impressive for (*a*) presumably they deal mostly with patients who do not want more children, (*b*) statistics can be made to prove anything, and (*c*) they naturally are biased; whereas I was only speaking of the use of contraceptives before or in the early days of matrimony—clinical experience being of greater value than supposition.

I am, Sir, yours faithfully,

V. B. GREEN-ARMYTAGE.

Harley-street, W., Feb. 14th.

*** Mr. Green-Armytage encloses his reply to the secretary of the Association. It runs as follows: "In answer to your letter of the 25th instant I did use the words which you quote at the meeting of the West London Medico-Chirurgical Society, and my conviction is as stated for the following reasons: (*a*) That if the hymen is unruptured at the time of marriage, insertion of jellies or medicated pessaries upsets the physiological *p*H of the vagina with the result that the cervix is bathed in an acid medium far lower than *p*H 4 for some hours. The result is irritation of the external os with subsequent erosion and endocervicitis. (*b*) Should in the early years or months of matrimony rubber caps with a containing soluble pessary be applied to the cervix for a matter of 12 hours or longer, the resulting effect is the same as in (*a*). (*c*) I have noted this particularly during the last twenty years during which time I have seen over 800 cases of sterility. A large number of these have used (*a*) or (*b*). (*d*) In the discussion I stated that if for medical or other reasons contraception was necessary in the early months of matrimony, it should be relegated to the use of a condom by the husband and not by the insertion of chemicals of any kind by the woman. (*e*) It is of course well recognised and taught psychologically that the early and continued use of contraceptives, either by husband or wife, diminishes libido and orgasm in both parties. (*f*) I also referred to the statement by Prof. Miles Phillips which appeared in the *British Medical Journal* a few weeks ago, under the heading of 'Endometrioma' in a discussion at the North of England Gynæcological Society, stating the opinion that the early use of contraceptives was responsible for the increasing number of cases of endometrioma which are seen to-day in young people. (*g*) There are other moral and minor factors with which I need not detain you, but I think you will find that experienced gynæcologists, male or female, will agree with my statement that contraceptive measures in the early days of marriage are inimical to pregnancy at a later date."—ED. L.

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A "LATIN TAG"

To the Editor of THE LANCET

SIR,—In your issue of Jan. 29th (on p. 281, a little after the cross-heading Should doctors be well educated?) Sir Walter Langdon-Brown refers to "The old Latin tag 'Who drives fat oxen must himself be fat.'" Will he give us the reference? In Boswell's "Life of Johnson" (Coker's edition. London: John Murray. 1848. Chap. LXXX, year 1784, June 14th) we read:

"Johnson was present when a tragedy was read in which there occurred this line—

'Who rules o'er freemen should himself be free.'

The company having admired it much, 'I cannot agree with you,' said Johnson, 'It might as well be said—

'Who drives fat oxen should himself be fat.'"

These are very nearly the same words, but there is no hint that the distinguished Latin scholar was citing a translation of a well-known Latin verse.

I am, Sir, yours faithfully,

Bristol, 8. E. WATSON-WILLIAMS.

GRAINS AND SCRUPLES

To the Editor of THE LANCET

SIR,—For months past I have looked forward to "Grains and Scruples" each week, and have seldom failed to derive therefrom instruction, stimulation, or entertainment. But there is a certain rancour about the contributions of A Hospital Physician which seems to me to be both unfortunate and unnecessary, and I feel that some of his statements should not go unchallenged. I can speak, of course, only for my own hospital, but I fancy that mine does not differ materially in the points at issue from other hospitals with medical schools. Let me take these points seriatim.

(1) "Until recently students in the medical schools were openly . . . advised against the choice of permanent salaried appointments; there was not only a professional but even a social caste convention that lent force to such advice."

No such advice was ever given, and "the professional and caste convention" is a delusion on the part of A Hospital Physician.

(2) "The public institution is often regarded with contempt and antagonism by the neighbouring voluntary hospital staff."

This is another delusion. My own hospital, like many other voluntary hospitals, works in close and cordial coöperation with neighbouring L.C.C. hospitals, and has nothing but admiration for the work done therein.

(3) "Nepotism undoubtedly often influences choice" (i.e., of new colleagues)". . . an additional staff appointment means another permanent competitor for fees . . . this competition is often the basis of the lamentable jealousy so often apparent between members of the honorary staffs of voluntary hospitals, and may lead to a complete absence of coöperation between two sections of a hospital."

I find it difficult to comment temperately on these ridiculous assertions. I can only say that at the hospital which I have the honour to serve all staff vacancies are advertised, and we endeavour to select the best candidate, whether trained in our own school or not. "Nepotism" is unheard of. The staff is constantly increasing in numbers, and it is my experience that when the work of a special department increases to such an extent that an assistant physician or surgeon to that department is desirable, such an additional staff appointment is invariably suggested by the head of that department, who does not appear to resent "another permanent competitor for fees." As to the "lamentable jealousy" and the "complete absence of coöperation,"—I am happy to say that these are non-existent.

(4) "The output of research work by clinicians in voluntary hospitals is now, in fact, not great."

I venture to suggest that the output of research work by clinicians in voluntary hospitals compares not unfavourably with that of clinicians in the council hospitals, in spite of the emancipation of the latter gentlemen from the drudgery of teaching "which contributes little or nothing to the understanding of disease"! to say nothing about their emancipation from the entirely gratuitous work, both in the hospital and outside it, which occupies at least half the working time of the consultant.

Finally I would add that if "conformity to upper middle class standards" may be interpreted as an ambition to doctor everybody honestly and efficiently, and to coöperate amicably and courteously with one's professional colleagues, well, I, for one, am all for it.

I am, Sir, yours faithfully,

Feb. 14th. VOLUNTARY HOSPITAL.

To the Editor of THE LANCET

SIR,—In last Saturday's issue of your journal an amazing statement is made in an article dealing with the dearth of money in voluntary hospitals. It reads as follows: "It is even the practice at one large teaching hospital in London to refuse admission to 'destitute' cases—i.e., those in receipt of public assistance—and to unmarried mothers, because the expense of their subsequent convalescence and 'social care' is considered prohibitive."

Such a state of affairs is incredible when it is the business of the almoner to deal with such cases without incurring unnecessary expense to the hospital. In both types of cases assistance can be obtained outside the hospital for the needed after-care. In the first instance, the National Council for the Unmarried Mother and the various branches of the Southwark Diocesan Association (Rescue Workers) will deal with the unmarried mother with her first baby. The public assistance committee are usually willing to help with convalescence, instruments, &c., for those in receipt of relief if a doctor's recommendation accompanies the application.

I am, Sir, yours faithfully,

E. V. SMYLIE,

Richmond-road, S.W., Feb. 15th. Almoner.

CAN DEATH CAUSED BY INJURIES RECEIVED IN A MOTOR ACCIDENT BE INSTANTANEOUS?

To the Editor of THE LANCET

SIR,—In the case of Morgan *v.* Scoulding recently tried in the King's Bench Division before Mr. Justice Lewis the plaintiff claimed as the administrator of his son's estate under the Law Reform (Miscellaneous Provisions) Act of 1934, damages from the defendant for the son's shortened expectation of life by reason of an accident which was due to the negligence of the defendant and resulted in the death of the son. By virtue of the said Act a right of personal action vested in a person at the time of his

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death can be pursued by his personal representative. The negligence of the defendant was found to be the real substantial cause of the accident. The plaintiff's son was riding his motor-cycle at a high speed on a main road as he was entitled to do. The defendant brought his car on to the main road from a side road without due care so that the plaintiff's son collided with the defendant's car, and to all appearances was killed instantaneously, as would reasonably be supposed from the speed at which he was travelling. So it was contended for the defendant that no right of action survived to the plaintiff. But the Judge said that he could not go into metaphysical discussions. All that mattered was that the injury had occurred before the death. The cause of action was not the death but the negligence causing the collision. That happened before the death, although there might be a split second between the collision and the death. The cause of action arose before the death and the right descended to the administrator. The Judge accordingly assessed the damages for loss of expectation of life at £1000, which seems now to be the standard rate for a person of 23, which was the son's age. If this decision is allowed to stand it will add considerably to the risks undertaken by the insurance companies. It is submitted that the cause of action was not the negligence but the injury which resulted from the negligence, and though there is no mention of the medical evidence in the report of the trial, the inference from the judgment appears to be that there must always be an interval between the receipt of the injury and death, during which the right to recover damages vests in the injured person.

I am, Sir, yours faithfully,

London, Feb. 15th. N. C. MACLEOD.

DUNDEE AND ELSEWHERE

To the Editor of THE LANCET

SIR,—I have read with interest your Scottish correspondent's note entitled Midwifery at Dundee and am stirred to add a few statements on its contents.

The situation he has chosen for comment is merely one edge of the black cloud at present rising over the whole voluntary system of hospital service as it at present exists in Great Britain. No one who has seen hospital services in this country and in others need doubt either the efficacy or the efficiency of voluntary hospitals in Scotland; but few who have given thought to the problem of the economic position of this system in the present trend of British democracy can speak either convincingly or comfortably of its future well-being. It is only necessary to consider present-day State demands, both on earnings and capital, to realise that the fruitful springs that have so generously supplied these magnificent undertakings with their material requirements will inevitably become dry, and that at no far distant date. It is our duty therefore to recognise now what is happening and save for the future what to us is grandest and finest in our voluntary system. That the voluntary hospital system does possess elements that are finer than any non-voluntary system can ever hope to acquire is undoubtedly true. Its very isolation from all authority gives it an open door to healing not possible to any locally owned system or edifice. What has to be sternly guarded against at this phase in the life-history of the voluntary hospital is that fanatical adherence to this isolation does not lead to strangulation of the system both spiritually and materially. The future life and health of the voluntary system lies in wedding the spiritual grandeur of the system to the material strength of the State as vested in municipal and county authorities. Failure to bring about this union by our generation must inevitably mean that we are responsible for the loss of something fine which we might have handed on to our sons and daughters.

It is regrettable that your correspondent should have failed to grasp the fundamental factors that lie behind the striking success of the Highlands and Islands medical scheme. It is idle conjecture now to return to the days before this scheme of medical services came into being, and try to imagine what the voluntary system alone could have accomplished in these areas. Perhaps nothing at all. To-day the scheme is one glorious amalgamation of all forces concerned with the welfare of the health of the people. Shining amongst them with no uncertain brilliance are the voluntary bodies. Neither will that brilliance get less. It has been reborn through years of constructive toil, but reborn with the full strength of all health services with it and in it. In that lies its wonder and its future.

In Dundee there appear to be signs that the storm is breaking. Whether it passes to an era of sunshine in and around its hospitals and medical school depends on the wisdom, vision, and forbearance of all parties concerned.

I am, Sir, yours faithfully,

Feb. 12th. "INTERESTED."

THE HARLEY-STREET PURGE

To the Editor of THE LANCET

SIR,—Those of us who are in genuine consultant practice cannot help welcoming Lord Howard de Walden's "purge" of those general practitioners who use a consulting-room in the Harley-street district to enhance their local reputation. But this purge, of which the lay papers have made so much, is only a financial one and there seems nothing to prevent the rich semi-quack from renting a whole-time room while the poor genuine consultant who is struggling through the registrar stage possibly will not be able to make the first step towards a lucrative practice. Surely everyone must admit that it is ludicrous that it should be left to a private landlord —however influential—to adjust the standards of our professional practice.

Too often one finds that those who pose as consultants have nothing more than a qualifying diploma such as that given by the Conjoint Board and practically no experience. In most continental countries the law is such that none may claim to be a consultant who has not fulfilled a minimum period of five years' post-graduate study and passed a specialist degree. Cannot the law of England be brought into line with other countries so as to make a similar course of study and degrees (passed by examination—honoris causa degrees are justly suspect) essential? The genuine consultant could not possibly object to such a law.

I am, Sir, yours faithfully,

Feb. 12th. R. LEE STREET.

*** It is just two years since Mr. F. C. Goodall in these columns remarked: "It ought to be known to the public that 'Harley Street' is not a degree but an address." What the well-trained consultant really has to contend with, however, is the state of mind that prefers addresses to degrees.—ED. L.

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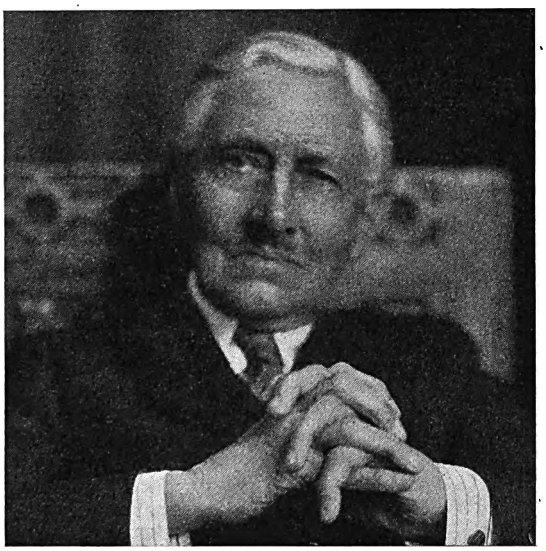
OBITUARY

SIR TRUBY KING, C.M.G., M.B., B.Sc. Edin.

FOR the last few years Sir Truby King had lived in retirement in the grounds of his mothercraft home at Wellington, New Zealand, and he died there on Feb. 9th in his eightieth year. The word mothercraft is now familiar in every civilised country and it should not be forgotten that it was to Truby King that we largely owe the conception of motherhood as a craft and not a gift or an intuition.

Frederic Truby King was the son of Thomas King of New Plymouth, New Zealand, and started life as a bank clerk which he detested. He found his career at Edinburgh University, where he was Ettles scholar and graduated in medicine, going on to take the B.Sc. in public health. At the age of 30 he returned to New Zealand as medical officer of the Wellington General Hospital, and a year later he was put in charge of the Seacliffe Mental Hospital, near Dunedin, where his interest in feeding problems was aroused by observing the behaviour of young animals on the hospital farm. On a visit to Japan he was impressed by the sturdiness of the people and the general ability of Japanese mothers to nurse their infants, and he determined to try to improve conditions in New Zealand by instructing mothers in the rearing of children. In 1905 he and his wife began the work of instruction with the aid of Nurse McKinnon in a stable at Dunedin, and a committee of ladies soon joined him in forming the Royal New Zealand Society for the Health of Women and Children, later called the Plunket Society after the wife of the then Governor-General (now Lady Victoria Braithwaite), herself a pioneer in infant welfare. The society started at Truby King's house on the Karitane peninsula, the first patients being neglected illegitimate babies. Their satisfactory response to treatment attracted other ill babies and in 1908 the society moved to a house which is now part of the Karitane Harris Hospital at Dunedin.



The success of this venture in the following years led to Truby King being invited by Lady Plunket to visit England in 1918, where he became the first medical director of what is now the Mothercraft Training Society. Dr. R. C. Jewesbury, who took over the directorship when Truby King returned to New Zealand, writes:

"I first met Truby King in 1918 at the Mothercraft Training Society's centre at Earl's Court. I remember him as a man of slight build with a keen thoughtful expression and a strong sense of humour. He was versatile and widely read and his common-sense views on the feeding and management of infants, acquired by an immense amount of careful study, and the remarkable results which had been obtained in New Zealand by putting his methods into practice, suggested the adoption of similar methods in this country. Undoubtedly his greatest achievement was to prove beyond question the importance of breast-feeding, and to demonstrate how, with a definite technique, this can usually be successfully accomplished. In artificial feeding he was a believer in modifying milks to approach the human standard in composition, and of estimating the amount of feed by the child's caloric needs. The Truby King methods have been criticised by other workers in this field, but their best recommendation is to be found in the result of cases followed up in the past 20 years."

In fact, more than 25 years before the profession really began to think in terms of constructive hygiene and the education of mothers in the nurture of their children, Truby King was advocating methods that are even now more widely accepted than lived up to.

"I now express," writes Dr. J. S. Fairbairn, "a personal tribute due to him for the most striking lessons of my professional career in applied physiology, obtained from his management of difficulties in lactation and the restoration of function after weaning. I had the good fortune to become closely associated with Truby King from the time of his arrival in England in 1917 by securing his services in charge of our infant welfare clinic, then in sore straits for lack of adequate medical supervision owing to the exigencies of the war. Some of us were needlessly concerned over possible reactions among the Lambeth mothers to one strange to them and ignorant of their casual ways. From the outset he gained their confidence and was welcomed by them in their homes, where he discussed their family budgets and other problems and acquired an intimate knowledge of them and their social background. The desire to get to the bottom of things by personal observation and the enthusiasm with which he threw himself for a few months into this work revealed something of the character of the man and his attitude to the problems of infant welfare. In spite of his frail physique Truby King had remarkable powers of close and constant application to the work in hand and when he took a break it was often a visit to see the work of other countries. Thus immediately the war was over he determined to investigate 'the greatest experiment of our time in infant malnutrition,' as he put it, among the countries of Central Europe, and as one of the British representatives at the inter-Allied Red Cross Conference he visited Austria and Poland to organise welfare work among the women and children. His success lay largely in his persistence and powers of hammering home the lesson he had to teach. 'The mother is the executive in the rearing of her family and you must work through her' was its keynote."

In 1919 he toured Australia to establish welfare centres there. He was appointed director of child welfare in New Zealand in 1921 and continued his mothercraft work until his retirement in 1927. It was a testimony to his efforts that the infant

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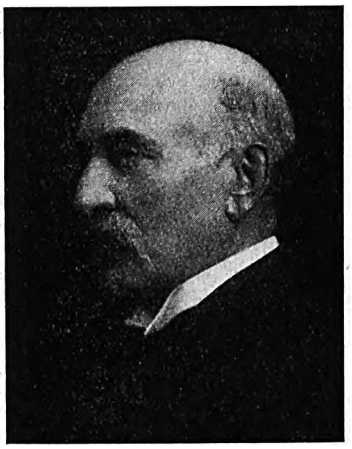
mortality-rate in New Zealand was halved between 1907 and 1928. He lived to see his centres imitated throughout the world.

Truby King married Isabella Cockburn, daughter of Adam Miller of Edinburgh, who was closely associated with him in his early work and died in 1927. He became a C.M.G. in 1917 and was knighted in 1925.

SIR JOSIAH COURT, M.R.C.S. Eng., J.P.

Sir Josiah Court died on Feb. 8th at Staveley in Derbyshire, where he had lived for 73 years, 50 of which he had spent in active general practice. As surgeon to the Derbyshire Miners' Association he established, in the face of opposition from all but the miners themselves, that miners' nystagmus was associated with defective lighting and was preventable.

Josiah Court was the son of John Court, a chemist, in Warwick, and was born in 1841. At the age of 14 he entered a shipping firm in Liverpool, but three years later he forsook this for the now defunct Sydenham College of Medicine. Later he moved to Guy's, where he qualified in 1863. Next year he bought a general practice in Staveley, where he rapidly secured the affection of the miners. In 1890 he undertook to investigate the causes of miners' nystagmus and carried out observations in Derbyshire, Durham, and Belgium, from which he concluded that the feeble illumination provided by the Davy lamps was at fault, rather than the position in which the miners worked. This led to a bitter controversy in which the mine inspectors, owners, and ophthalmologists were ranged against him, and it is said that when he read his paper before the British Medical Association at Nottingham in 1892 one well-known ophthalmologist refused to share his railway compartment. Professional opinion gradually veered to his side and he finally triumphed at the Oxford Ophthalmological Congress in 1923.



Sir Josiah was a staunch Conservative and six times unsuccessfully contested the Liberal, and then Labour, stronghold of the north-eastern division of Derbyshire. In 1865 he married the daughter of John Hyde, and he leaves three sons. He was knighted in 1920.

Sir Arthur Hall, a personal friend for many years, writes: "With the death of Sir Josiah Court at the ripe age of 97 there passes a great figure of the Victorian country practitioner at his best. Tall and handsome, with a kindly and genial manner, a thorough practical knowledge of his profession, and an abundant share of shrewd common sense, 'Court of Staveley' inspired confidence and retained it. He was the adviser and friend not only at the large country houses of the county families, but in the homes of the middle classes and in the cottages of the people. In each he was equally welcome, equally at home, and equally trusted.

"Reference has been made to his advocacy of improved lighting in mines, and although nystagmus has not yet disappeared, the value of his pioneer work must not be forgotten. That it succeeded is itself evidence of his determination and a tribute to his exceptional personality and character. Fortunate indeed is the place which secures for itself the life service of such a man."

Dr. CHARLES PARKER STEWART died very suddenly on Feb. 2nd. He had recently retired from the post of medical officer of health for Perth which he had held for 37 years. He was born at Perth and graduated M.B., C.M. with first class honours at Edinburgh University in 1893, taking his B.Sc. in public health in the following year. After being assistant medical superintendent at Croydon Infirmary, he was appointed medical officer of health and police surgeon at Perth in 1899. He was much interested in the problems of infant mortality and during his term of office at Perth did much to improve the health of the town.

PUBLIC HEALTH

The Maternity Problem of a Smaller Town

THE provision of adequate maternity services is comparatively simple in large towns where facilities are close at hand, but in the smaller towns various difficulties have to be overcome, one of the main ones being the decreasing obstetrical experience of general practitioners. In London in 1936, according to a recent report of the Voluntary Hospitals Committee, 67·7 per cent. of confinements were in institutions and only 20 per cent. were attended by independent midwives and doctors. In his paper to the Royal Sanitary Institute at Dewsbury on Feb. 11th Dr. J. F. Galloway, the medical officer of health, said that in that town (of 54,000 inhabitants) only 5 per cent. of mothers engaged medical practitioners for their confinements. The 23 practitioners resident in the town booked on an average two confinements a year each and no one booked more than ten. Including the cases which they attended at the call of a midwife five doctors saw an average of twenty cases a year, six between five and ten cases, and twelve saw less than five. Any complication which is beyond the scope of a midwife may require a doctor with special obstetrical experience, and Dr. Galloway considers that a doctor who sees less than ten cases a year cannot be said to have this. If the five who see most cases were formed into a panel to be at the call of the midwives, each would attend an average of from 25 to 30 cases a year, which would be sufficient to keep them interested and experienced. Membership of such a panel would clearly give a practitioner an advantage over his colleagues, and difficulties might arise where for example a newly arrived but expert practitioner sought admission to it. In Dewsbury a service of consultants, usually free of charge, is available and increasingly utilised, and Dr. Galloway suggests that the local authority should have upon its staff a skilled resident obstetrician, with whom the nurses are accustomed to work, to assist practitioners and midwives in emergencies pending the arrival of a consultant from a distance, and to carry out ante- and post-natal work. If the

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opportunities for advancement in a municipal service were equal to those in the fever and other services, local authorities would find no lack of applicants of sufficient experience and skill.

Vital Statistics of 1935

The text volume for 1935 now issued [1] contains in addition to the customary routine analyses some special features of much interest. For example, infant mortality is examined in different groups of county boroughs, those which experienced a high total rate in 1935 being contrasted with those which experienced a low total rate, in order to determine which causes of death are mainly responsible for the great differences observed. The low rate of 31 per 1000 live births was registered in Oxford and Ipswich and the high rates of 94 and 98 in St. Helens and Wigan. In the group of towns with the lowest total rates, mortality from congenital causes (half of which are attributed to prematurity) is rather less than half the corresponding mortality in the towns with the highest total rates. Large numbers of these deaths therefore appear to be due to remediable causes. At the best rate there would have been 4135 such deaths in the county boroughs as a whole in place of the 6979 actually recorded. Other causes contributing to the excess in the worst towns are pneumonia and bronchitis, diarrhœa and other digestive diseases, measles, and whooping-cough, while violence varied but little. It is suggested that it ought to be possible for every northern town to achieve a rate below 50 and for every other town a rate below 40—which would mean an annual saving of more than 4000 infant lives in the county boroughs alone.

The tabulation of the causes of death depends to some extent upon rules of selection when more than one cause is entered upon the certificate. In 1935 a test was made of the effect upon the statistics of replacing these rules by a literal reading of the order of statement of the causes. It is reported that the proportion of certificates with unsatisfactory entries has now become small enough for the Registrar-General to substitute for the rules in most cases the doctor's opinion as to the essential cause of death. Arrangements are being made to carry this into effect from 1941.

In an analysis of mortality from tuberculosis since 1851 reference is made to the rise or arrested fall in the death-rate of young adults between, roughly, 1926 and 1933. These rates have been declining again in the last few years and it suggested that the earlier lack of improvement may have been the delayed results of the food shortage of 1916–18 operating on the children of the war years as they reached a dangerous age for the development of phthisis.

Maternal mortality, cancer, cerebro-spinal fever, and many other causes of death also come in for special consideration.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED FEB. 5TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2417; diphtheria, 1874; enteric fever, 69 (34 "expected"); pneumonia (primary or influenzal), 1128; puerperal pyrexia, 210; cerebro-spinal fever, 34; acute poliomyelitis, 6; acute polio-encephalitis, 1; encephalitis lethargica, 1; relapsing fever, 1 (Kendal); dysentery, 215; ophthalmia neonatorum, 102. No case of cholera, plague, or typhus fever was notified during the week.

Of the 69 cases of enteric fever 29 were notified from Somerset (Burnham 9, Bridgwater R.D. 20) and 19 from Pembroke (Haverfordwest). The remainder occurred for the most part singly in 9 counties as follows: Chester 1 (Stockport); Dorset 2 (Poole, Dorchester R.D.); Durham 1 (Whickham U.D.); Kent 4 (Chislehurst, Folkestone, Orpington, Rochester); Lancaster 1 (Salford); London 2 (Kensington, Westminster); Northumberland 5 (Newcastle 4, Longbenton U.D. 1); Nottingham 2 (Nottingham, Southwell R.D.); Surrey 2 (Barnes, Coulsdon); Port Sanitary Districts (Liverpool 2).

The number of cases in the Infectious Hospitals of the London County Council on Feb. 11th was 4562, which included: Scarlet fever, 845; diphtheria, 1357 (carriers 39); measles, 945; whooping-cough, 295; puerperal fever, 20 mothers (plus 9 babies); encephalitis lethargica, 282; poliomyelitis, 0. At St. Margaret's Hospital there were 21 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 27 (3) from measles, 4 (0) from scarlet fever, 27 (5) from whooping-cough, 37 (4) from diphtheria, 68 (19) from diarrhœa and enteritis under two years, and 66 (8) from influenza. The figures in parentheses are those for London itself.

Exeter reported the only death from typhoid. Liverpool had 6 deaths from measles, Manchester 5. Liverpool also reported 8 fatal cases of whooping-cough, Birmingham 2. Diphtheria was fatal in 24 great towns, Liverpool and Birmingham each reporting 4 deaths, Newcastle-under-Lyme 3, no other great town more than 2.

The number of stillbirths notified during the week was 281 (corresponding to a rate of 41 per 1000 total births), including 29 in London.

[1] Registrar-General's Statistical Review of England and Wales for the year 1935. (New Annual Series, No. 15.) Text. H.M. Stationery Office. 3s.

THE LANCET 100 YEARS AGO

February 17th, 1838, *p.* 750.

A quotation from a letter addressed by Professor Elliotson to the Medical Faculty of the University of London, protesting against their proposal to split the course of lectures in medicine into two: first, general pathology and morbid anatomy; secondly, the practice of medicine.

The course which I deliver in *University College* consists of about 150 lectures, and 20 examinations. I commence with an account of what is meant by disease, and of symptoms; I examine the nature and operation of the various causes of diseases in general, and the general plans to be followed for their prevention, alleviation, and cure: all which is general pathology, and occupies a considerable time. I then proceed to the history, nature, causes and treatment of general diseases, or those which may affect various parts, such as inflammation and all its consequences, suppuration, mortification, &c., hæmorrhage, dropsy; and all changes of structure, whether common, as hypertrophy, atrophy, induration, softening, &c.; or specific, as cancer, melanosis, scrofulous tubercle, &c.; thus giving the fullest information on general morbid anatomy. After speaking of universal diseases, or those which are not seated in individual parts, such as continued, remittent, and intermittent fever, anæmia, scurvy, &c., I arrive at the diseases of individual parts; and, commencing with the surface, I proceed through the head, chest, and abdomen. In this division of the course I illustrate, by individual diseases, all the general principles and views propounded in the first division, and exhibit in detail the effects of the general diseases, formerly spoken of, upon each organ in succession,—the symptoms and the changes of structure induced; and, both in the first division and in this, I exhibit all the morbid preparations of our museum, and all the drawings of morbid anatomy made by Dr. Carswell, as well as numerous others, and engravings. . . .

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REPORT OF THE CROYDON INQUIRY

Mr. H. L. Murphy, who with Mr. H. J. F. Gourley and Sir Humphry Rolleston as assessors constituted the Minister of Health's commission of inquiry, issued his report on Feb. 15th. He said:

The immediate cause of the outbreak was a portion of the public water-supply becoming infected by the typhoid bacillus. The infected portion was that derived from a chalk well at Addington. How that well became infected is a question that cannot be answered with absolute certainty, but all the circumstances and probabilities point so strongly in one direction that I feel justified in coming to a definite conclusion on the subject. That conclusion is that the well was infected by the fact that at the end of September and during October, 1937, men, one of whom was an active carrier of typhoid, were working in the well and that during large parts of such period water from the well, unfiltered and unchlorinated, was being pumped to supply.

Mr. Murphy then described the sources of the Croydon water-supply and its distribution by a high and a low level system. All the typhoid cases were within the area of the high level supply or had had opportunities of drinking the high level supply water, which came from the Addington well, and there had been complete unanimity amongst the scientific experts that this well was the cause of the epidemic.

Source of Infection

Dealing with the question of how the water from the Addington well became infected, Mr. Murphy said that between Sept. 24th and Oct. 28th 18 workmen were engaged in making certain alterations in the well to enable repairs to the pumping plant to be carried out. Between Oct. 16th and Nov. 3rd, in spite of this work in the well, its water was pumped to supply and owing to the mechanical arrangement of the plant neither the filters nor the chlorinating plant could be used.

The men were lowered into the well in a "skip" or foreshortened barrel, which was unpopular as having been the cause of a fatal accident in January, 1937.

The provision for workmen requiring to relieve themselves while in the adit, said Mr. Murphy, was this. An ordinary stable bucket was let down and kept in the adit. When, according to the evidence, it became half-full it was placed on, and bedded into, one of the loads of chalk going to the surface. . . . The actual work the men were doing was lighted by hurricane lamps. In what part of the adit the bucket was kept did not clearly appear. I am satisfied that the men were warned that if their bowels were moved they should come to the surface where there was adequate lavatory accommodation. I am also satisfied that in this long dark gallery where water was flowing there were ample opportunities, if a man were so minded, for the deposit of fæces and that there can have been no desire to multiply the daily journeys, up and down, in the skip. The typhoid carrier to whom I have already referred and who was, by common consent, described at the inquiry as 'Case A,' worked in the well with certain recurring intervals from Sept. 28th to Oct. 26th. . . . The dates of the onset of symptoms point to the original infection having taken place while the work was proceeding in the well and while the carrier was there. I have been supplied with charts, and I gratefully acknowledge the assistance I have derived from them, correlating the dates of the carrier's presence in the well with the dates of notification of the disease, the dates of the onset of symptoms so far as ascertainable, and the dates of infection, taking different periods of incubation. They all enforce the same conclusion. That conclusion is supported by the views on probabilities expressed by every medical gentleman who appeared before me and who was aware that the presence of a carrier in the well at the material time had been ascertained.

OTHER POSSIBLE SOURCES

Although he had come to the definite conclusion that the well had been infected, Mr. Murphy had had his attention called to other possible sources of infection. The state of the gathering ground at Addington was of importance as the soil was chalk covered with more or less permeable clay-with-flints, and it was now recognised that it was possible for water to flow through fissures in such a soil almost completely unfiltered.

If one was driven, said Mr. Murphy, to seek for a source of infection in this area one would look either at the farm known as Fisher's farm or at the site of a latrine used by workmen while building a school closely adjoining the well itself. . . . For the purpose of the inquiry a careful investigation was undertaken into the medical history of those occupying houses (and more especially houses relying upon cesspits) and farms upon the gathering ground. The result was that over a considerable time no case of typhoid had been notified or known in this area. In these circumstances I think it is safe to conclude that though the gathering ground undoubtedly contained potential sources of danger the actual infection of the well was not derived from it.

WORK IN THE WELL

Mr. Murphy said that although one of the pumping engines was badly in need of repair, the work was not urgent. It was quite possible, though inconvenient, to shut off the supply from the well while work was taking place and it was also possible to install a chlorinator at the Addington reservoir. Both of these measures had since been taken but neither was adopted at the time.

There was both misunderstanding and lack of communication between the responsible officers of the corporation in connexion with the work, said Mr. Murphy. Dr. Holden, the medical officer of health, was never informed that the work was being carried out at all. He was in complete ignorance of it until after the outbreak had taken place. It is true that Dr. Holden's duties did not include any direct responsibilities with regard to water, but he was sent monthly analyses of the water taken from certain of the wells and reservoirs. He had frequently made careful comments upon these analyses and had advised on the question of chlorination. I cannot help thinking that if Dr. Holden had been informed that men were working in the well and that simultaneously filtration and chlorination had ceased his advice would have been sufficient to put an end to such a state of affairs. His ignorance of the fact that chlorination had ceased may seem the less surprising when I go on to say that Mr. Boast, the borough engineer, who was the person directly responsible for the water-supply, was also in ignorance of it. At a meeting preliminary to the work being commenced between Mr. Boast, Mr. Brandram-Jones, the assistant water engineer, and Mr. Ellis, the mechanical engineering foreman in the Waterworks Department, it was brought home to Mr. Boast's mind that the proposed work would involve by-passing to a considerable extent the filtration plant. I am not satisfied that he then understood that it would involve a total by-passing of the filtration plant even when the water was being pumped to supply. He certainly never understood that it would involve elimination of the chlorinating plant. It was common ground between all three witnesses as to this interview that no mention of the chlorinating plant was made at all. . . . What is extremely difficult to understand is how (even in the

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absence of any communication with the medical officer of health) it occurred to none of these gentlemen that the fact of men working in the well during a period when water was being pumped to supply afforded strong grounds for the stepping-up of the dosage of chlorination in contrast to its elimination.

HEALTH OF THE WORKMEN

Mr. Murphy pointed out that the men selected for the work were not of the regular waterworks staff but volunteers who were mainly usually engaged on sewer works, and therefore not familiar with the high standard of care needed in connexion with water. He had been told that they were carefully selected for physical fitness but could not understand how some of them could have been accepted on their appearance as physically fit.

Case A, in particular, he said, could not, in his opinion, have conveyed the impression of a healthy man. The important point is that there was no examination at all, however cursory, by the only class of person who would have been qualified to express any opinion of value upon the subject—namely, a member of the medical profession. It was present to the minds of Mr. Boast and his assistant that the state of the men's health was a matter of importance yet neither the medical officer of health nor any assistant of his was asked to examine them. Indeed, as I have already pointed out, the medical officer of health's department (situated in the same building as that of the borough engineer) was left in entire ignorance of the work being carried out at all. No one would expect that as a preliminary to this class of work there should be bacteriological tests made of the fæces and urine. When, however, there is no urgency about the work, a Widal blood test would appear to be a not unreasonable precaution.

SANITARY ARRANGEMENTS

Mr. Murphy found that the arrangements for urination in the well were quite unknown to Mr. Boast, who thought that he had directed that men should come to the surface either for urination or defæcation. There may have been some misunderstanding due to Mr. Boast employing the term "using the lavatory," but as things were the provision for urination in the well, in Mr. Murphy's opinion, gave no guarantee of safety. The most elementary care would dictate at least the use of a vessel which could be closed before being hauled to the surface. Although Case A had been shown to carry typhoid organisms in his fæces, the scientific evidence had established that more than half of fæcal carriers excreted organisms intermittently in their urine.

Mr. Murphy commented on the singular lack of attention that the gathering ground had received before the outbreak. In particular it was regrettable that a contractor's workmen engaged on corporation work had been allowed to dig a latrine almost directly above one of the well adits. It was also regrettable that the existence of privies at Fisher's farm had been ignored. Of these and other undesirable features of the gathering ground Mr. Boast had been ignorant before the outbreak.

I should say at once that Mr. Boast's duties as borough engineer covered so wide a range of matters as to make it impossible for him to give detailed personal attention to the highly important subject of water-supply. He was responsible for highways, lighting, drainage, housing, and many other matters. It may well be a matter for consideration whether in a borough of the dimensions of Croydon with its own water-supply that supply should not be under the direction of a fully qualified water engineer reporting to a water committee and keeping in close touch with the medical officer of health.

Steps Taken to Deal with the Outbreak

Consideration of such steps, said Mr. Murphy, might be naturally divided into two periods, the one before and the other after Nov. 4th, 1937, when the source of the infection had been ascertained and when the supply of water from the Addington well had been definitely stopped. The first period was a short one. On Oct. 20th notification was received of a typhoid case, now agreed to have been unconnected with the outbreak. . . . On Oct. 27th the first case arising out of the outbreak was notified, on Oct. 28th another case, and on Oct. 30th two further cases. On the same day Dr. Holden received a letter from a Mr. C. H. Rimington calling his attention to two further cases and stating, with considerable prescience, that even in these early cases other possible causes could be eliminated and that "the only common thing appears to be water." On Oct. 31st Dr. Holden and Mr. Boast were both present at a meeting of ratepayers organised by Mr. Rimington. Mr. Boast, Mr. Murphy remarks, was unaware until that day that any cases of typhoid had occurred in the borough, and he adds:

This undoubtedly arose from Dr. Holden having formed the view that the possibility of water being the cause of the cases which had been notified was comparatively remote. . . . There are a number of explanations of this. He had had the sporadic case on Oct. 20th; since then he had had only four notifications apart from the two mentioned in Mr. Rimington's letter. He was in complete ignorance, through no fault of his own, of the work that had been carried out in the Addington well and of the fact that chlorination there had stopped. There was nothing at the time to make him visualise the extent of the coming epidemic although there was sufficient to make him uneasy. Sporadic cases of typhoid, though happily increasingly rare, are still common in the experience of a medical officer of health whose area comprises a population of a quarter of a million. Up to July, 1937, from the beginning of the year, there had been ten notifications of enteric fever in the borough, nine of which were cases of paratyphoid, the less virulent form of the disease which is very commonly derived from articles of food contaminated by a carrier. Dr. Holden had, no doubt, in his mind the last substantial outbreak of typhoid in the country which was, in fact, found to be caused by milk, albeit the primary cause was the infection of the milk by water, though not from a public water-supply. At the same time I think it is proper to point out that Dr. Holden was under the impression that water was comparatively rare as a cause of recent outbreaks of typhoid. That impression was wrong. I had the advantage of hearing the evidence of Dr. Suckling . . . that even before it is possible to draw a line between the sporadic and the epidemical, water should be immediately suspected and if there is any priority in the course of examination for possible causes it should be given to water.

It was on Oct. 31st that Mr. Boast, now apprised for the first time of the existence of typhoid in the borough, telephoned to Mr. Brandram-Jones at the place where he was then engaged and received from him the surprising information that chlorination at the Addington well had ceased for a considerable period. Dr. Holden and Mr. Boast discussed the matter and as a result, on the morning of Nov. 1st, an adequate dosage of chlorination (0·18 p.p.m.) was applied to the Addington well. The facts point to infection having ceased from this date even if it had not ceased at a slightly earlier date, the carrier having left the well on Oct. 26th.

Mr. Murphy then referred to the visit, at Dr. Holden's request, of Dr. E. T. Conybeare of the

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Ministry of Health, whose mind on his arrival on Nov. 3rd moved instantly to water as a possible source of the infection and one of whose first inquiries was whether the residences from which cases had been reported were all on the same water-supply.

It is remarkable, said Mr. Murphy, that there should not have been readily available in the borough engineer's office some map which would enable him or his assistants quickly to determine whether a particular house was on the high level supply or the low level supply. Armed with such a map on Oct. 31st Dr. Holden and Mr. Boast might have satisfied themselves of the fact that the first six cases notified were on the high level supply. It is an undoubted fact that the pipeline system in Croydon is extremely complicated, but it is hard to believe that its ramifications cannot readily be traced in the borough engineer's office.

Events after Nov. 4th are dealt with shortly, for the primary source of infection had then definitely ceased to operate. It was only from water in mains and cisterns originally supplied from the Addington well that any infection could possibly be derived.

It is to be remembered, said Mr. Murphy, that from Nov. 1st a measure of chlorination sufficient to destroy the typhoid bacillus had been in operation at the Addington well and that in the normally occupied house deriving its water from that source the cistern would, at the utmost, contain a day's supply and generally a good deal less. It is also important to bear in mind the short life of the bacillus except in environments quite different to a household water-supply. This question of household cisterns at one time bulked largely in the minds of my assessors and myself as a possible explanation of some of the later cases. We obtained a plan showing the 19 latest cases to be notified. . . . The plan showed that most of the houses concerned had small storage capacity varying from 17 to 26 gallons. . . . No less than 6 out of the 19 had no storage tank at all. . . . I have been driven to the conclusion that the continuance of any polluted water in the cisterns and storage tanks after Nov. 4th played no part in the epidemic. I do not, however, intend to minimise the general importance of this matter more especially with regard to houses that might be temporarily unoccupied. On Nov. 11th Dr. Suckling arrived in Croydon . . . one of his first recommendations was that water stored in unoccupied houses should be run off. . . . It seems to me, on the evidence, that this is a very desirable precaution and should be recommended at the very earliest possible moment after the water-supply is ascertained to be the probable source of infection.

Collaboration between M.O.H. and Practitioners

Mr. Murphy then turned to a matter of criticism which was to some extent related to both periods of the outbreak.

On Nov. 1st Dr. Holden, by letter, notified all the registered medical practitioners in the borough of the fact that certain typhoid cases had occurred in South Croydon. No details were given other than a general warning to keep the possibility of typhoid in their mind. It would be doing an injustice to the local medical practitioners to assume that, with this warning before them, they would not seriously consider the possibility of typhoid in any case of fever that they were called in to treat. That they would do so was stated in evidence which I accept, and indeed it seems obvious. On the other hand, there was uncontroverted evidence from the highest source before me that the clinical symptoms of typhoid vary in particular outbreaks and that the early symptoms can readily be mistaken for those attributable to other causes. The early manifestations sometimes seem to be not unlike those of influenza and they can be, and have been, mistaken for those of appendicitis. In addition, the remarkable diminution of typhoid in this century has deprived medical practitioners of any common acquaintance with the disease.

These facts seem to me strongly to enforce the view expressed by Sir William Willcox . . . that in all large areas there should be some committee representing all the local practitioners which, upon the occurrence of any outbreak, would be in constant and close touch with the medical officer of health and would provide the means of pooling and distributing all the information available from time to time as to symptoms and possible causes. For instance, in the present case, it would have been of assistance to the general body of practitioners for the purposes of diagnosis to know as soon as possible that water had been identified as the source of the disease. It is desirable to make two things clear:

(1) Sir William Willcox was not directing any special criticism at the corporation's medical services for lack of some such committee as this. On the contrary, he emphasised the fact that the absence of such a body was general throughout the country except in very few cases.

(2) Nothing in his evidence detracted from the fact that after the outbreak had taken place the sole responsibility for dealing with it rested with the medical officer of health and that he could not at the time of such a crisis be expected to act as chairman of a committee.

The view expressed by Sir William Willcox was a plea for some means of creating closer contact and more ready communication between the medical officer of health and the general body of practitioners, and part of the value of the suggestion seems to me that it might tend rather to easing than increasing the work of the medical officer of health during the course of an epidemic. I would observe too that a very large number of cases in this epidemic occurred on the very borders of the borough and that it was obviously desirable that contact and communication should be established between the medical officer of health and a slightly larger number of doctors than those with addresses in the Borough Directory.

[In order to avoid a possible source of confusion Mr. Murphy made it clear as a result of inquiry subsequently made that if Sir William had been aware of the fact that at the material dates there had been a typhoid carrier in the well (of which he was unaware through no fault of his own) his opinion as to the cause of the infection would not have differed from that of his medical colleagues.]

The Medical Officer Himself

The inquiry, said Mr. Murphy, had included a great deal of forcible, searching, and severe criticism of corporation officers. It was never suggested, however, that once a case of typhoid was reported it was not promptly, carefully, and skilfully dealt with. Nobody had had anything but praise to say of the hospital arrangements, the nursing, and the medical attendance.

I have largely dealt, he went on to say, with the conditions that caused the outbreak and with the detection of the source of infection. These matters must not be allowed to obscure the fact that the main task of the medical officer of health throughout the epidemic was the provision of accommodation for the sufferers and the treatment necessary to keep down the death-roll as far as possible. The burden in that respect cast upon Dr. Holden was, as it must inevitably be in a case of this sort, an enormous one and nobody suggests that he did not discharge it adequately and well. Counsel appearing on behalf of certain local medical bodies put forward, with considerable skill and moderation, an appeal for greater coördination between the medical health department

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and general practitioners, but expressing the views of his clients, described Dr. Holden as "a loyal, able, and industrious servant of the corporation as well as a truthful and careful witness." With that expression of opinion I concur.

It appears to me that the only legitimate criticism that can be directed at Dr. Holden in this case is a slight delay in his realisation that "water" was or might be the cause of the epidemic. I do not think that until after Oct. 29th he had any reason for directing his mind to water. The two cases notified up to that date, like the earlier case on Oct. 20th, might well have been regarded as sporadic. On Oct. 30th he had two more notifications and the indication of two further cases, making six in all. I think by then his mind might well have turned to water but it is clear from the evidence as to what took place on Oct. 31st that he remained until then reluctant to consider water as a probability. As I have already said, it was on the morning of Nov. 1st that effective chlorination took place at the Addington well although Dr. Holden admitted that this was done as a precaution and not because the well was then suspected.

From these facts it will be obvious that any criticism of delay in attacking the Addington well supply must be based upon a period not exceeding two days, and I must repeat that Dr. Holden until Oct. 31st was ignorant of the fact that chlorination had ceased at the well. If separate samples of the well water were taken on Oct. 30th, as they were in fact on Nov. 3rd, the result would have been known at the earliest on Oct. 31st and could, at best, have meant the speeding up of chlorination by some hours. The dates of the various cases render it unlikely that any infection was caused by this short delay, and if I had to come to a conclusion upon the matter I should say that it was not.

The Addington Well

Nothing in his report, said Mr. Murphy, must be taken as suggesting that there was something dangerous about the Addington well. The epidemic arose from an avoidable and external cause and not from anything inherent in the well itself. In fact the infection was due to an unfortunate and rare coincidence of three factors:—

(*a*) Constructive changes taking place in the well.
(*b*) One of the workmen being a typhoid carrier.
(*c*) The process of chlorination being in abeyance.

With due attention to the gathering ground and suitable chlorination there was no reason why the Addington well should not provide a perfectly healthy drinking water. The evidence, however, makes me think, he concluded, that analyses of the water from these chalk wells should not be at such long intervals as a month.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

IN the House of Lords on Feb. 15th Lord STONEHAVEN introduced the Collecting Charities (Regulation) Bill, providing for the better regulation of collections for charitable, benevolent, or philanthropic purposes from house to house, or in places of entertainment or refreshment.

In the House of Commons on Feb. 15th the Housing (Financial Provisions) Bill, which is designed to further slum clearance work and the abatement of overcrowding, was read a second time by 258 votes to 137.

QUESTION TIME

WEDNESDAY, FEB. 9TH

Infantile Mortality in St. Kitts

Mr. RIDLEY asked the Secretary of State for the Colonies whether he was aware that the infantile mortality figures in St. Kitts was 300 per 1000; and what action he proposed to take with a view to reducing the high rate of infantile mortality in that island.—Mr. ORMSBY-GORE replied: The infantile mortality figure in St. Kitts, according to the 1936 Medical Report, was 164·1 per 1000. Active steps have been taken in St. Kitts in recent years with a view to reducing infantile mortality, which was as high as 245·57 per 1000 in 1926 and 204·7 in 1934. It will thus be seen that a steady reduction is being effected, and I hope that this will continue.

Malaria among Troops in Trinidad

Major MILLS asked the Secretary of State for the Colonies if he was aware that a company of the Sherwood Foresters was sent last November from Bermuda to Trinidad owing to disturbances there; that this company was sent to the Pitch Lake, and was obliged to live in bell tents from about the middle of November until the end of December while huts were being built for them; at whose instance these troops were sent to that hot and unhealthy spot; what percentage of the troops had suffered from malaria; and why such duties as they were asked to perform there were not carried out by the Trinidad constabulary and volunteers.—Mr. ORMSBY-GORE replied: Yes, Sir. The troops were dispatched to Trinidad at the Governor's urgent request and stationed by him at Brighton with a view to restoring confidence among the law-abiding and responsible section of the community in the Southern area of the island where confidence was lacking. I deeply regret that 31 cases of malaria occurred between Nov. 22nd and Dec. 26th. While the troops were under canvas the incidence of malaria was such as to cause concern, but since their accommodation in mosquito-proofed huts the detachment is living under conditions similar to those in which numbers of Europeans reside in the same area without loss of health, and the Acting Governor and his medical advisers are satisfied with the arrangements now made. As regards the last part of the question the dispatch of these troops was only authorised because the Governor considered that in the then circumstances the use of the police and local volunteers might be inadequate.

Major MILLS: Is the right hon. gentleman aware that the shade temperature in this locality in December is 90° F. and that in the model village referred to in the report of the Commission the white inhabitants, at any rate, live in mosquito-proof houses because the locality is so unhealthy?

Mr. ORMSBY-GORE: That may be so.

Captain HEILGERS: Were these troops provided with mosquito nets when they were sleeping in bell tents?

Mr. ORMSBY-GORE: I must have notice of that question.

THURSDAY, FEB. 10TH

Physical Training

Captain PETER MACDONALD asked the Parliamentary Secretary to the Board of Education whether it was within the scope of the bodies set up under the Physical Training and Recreation Act to encourage utilitarian exercise, such as assistance with agricultural reclamation work as well as games and straightforward physical exercises.—Mr. KENNETH LINDSAY replied: The adoption of suitable methods of encouraging physical training and recreation is one of the matters which the National Advisory Council would properly investigate, and on which they would advise His Majesty's Government, and I understand that, so far, the particular point raised by my hon. friend has not been considered. My noble friend does not regard the utility of any particular form of exercise as constituting in itself any ground for adopting or rejecting it; the overriding consideration is the extent to which it promotes physical well-being. It is, however, not one of the objects of the Government's scheme to provide the means of carrying out works of public utility.

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Replying to questions by Mr. HEPWORTH and Mr. LEACH, Mr. KENNETH LINDSAY said: Grants have been approved by the Board of Education under the Physical Training and Recreation Act, 1937, in respect of eleven capital projects, including four swimming baths, three gymnasia, and four clubs, and many further projects are under consideration. Grants have also been made to the Central Council of Recreative Physical Training towards the training of teachers and leaders, and to fifteen other voluntary associations towards the development of their work for physical training and recreation. My noble friend is not aware that any difficulties have so far arisen in regard to the acquisition of land, and as regards playing fields, a substantial sum is being placed at the disposal of the National Playing Fields Association. The establishment of the area committees has now been completed, and my noble friend is glad to have this opportunity of expressing his appreciation of the coöperation of local authorities in the setting up of the committees and of the assistance which they have afforded in regard to the temporary arrangements which were necessary until the committees could be provided with the requisite staff and office accommodation. Now that the area committees are getting to work, my noble friend has every hope that rapid progress will be made in the development of the facilities which the Act was designed to promote.

Mr. SUTCLIFFE asked the Parliamentary Secretary to the Board of Education what progress had been made under the Physical Training and Recreation Act with the commencement of the physical training college.—Mr. KENNETH LINDSAY: The acquisition of a site for the National Physical Training College is at present actively under consideration. The Board are also considering the detailed accommodation which will be required to meet the various needs of the College.

Smoke Abatement

Mr. ELLIS SMITH asked the Minister of Health (1) if his department accepted the advice of the chief inspectors for dealing with the problem of smoke; and, if so, had any steps been taken to set up the suggested joint committee of the Stoke-on-Trent and Newcastle-under-Lyme corporations, as on page 14 of the seventy-third annual report by the chief inspectors, and to secure the employment of competent inspectors; and (2) if his attention had been directed to pages 13 and 14 of the same report; and what steps were being taken, or proposed, to put into effect the advice of the inspector.—Sir KINGSLEY WOOD replied: In accordance with the usual practice the suggestions made in the chief alkali inspector's report for dealing with the smoke problem in the Potteries have been followed up. The two corporations referred to, while they have not as yet seen their way to form a joint committee, have decided to adopt an active policy, and one of them has in fact instituted proceedings in a particular case. The technical suggestions in the report have been communicated to the corporations and to the research association of the industry who are investigating the matter.

Public Assistance Scales

Mr. ELLIS SMITH asked the Minister of Health if his attention had been drawn to the resolution passed by the Manchester public assistance committee that the present scales of relief were not adequate to meet fully the needs of recipients of relief; and if he would take steps to bring about a uniform increase throughout the country.—Sir KINGSLEY WOOD replied: I understand that the Manchester City Council have adopted a recommendation of their public assistance committee for certain increases in the rates of relief granted in the city. As regards the second part of the question I would refer the hon. Member to para. 6 of Circular 1662 of Nov. 22nd.

Private Sewage Systems

Sir JOSEPH LEECH asked the Minister of Health whether it was the practice of local authorities to require the registration with them or with his department of the exact positions of privately owned cess-pits, septic-tanks, and drainage tanks and systems, so as to guard against risk of the pollution of local wells and streams in the vicinity of drinking-water supplies by overflow, percolation, or flood water, notwithstanding chlorination.—Sir KINGSLEY WOOD replied: No, Sir. But local building by-laws require the position of cesspools, &c., to be shown on the plans submitted to the local authority.

Typhoid in Somerset

Sir FRANCIS FREMANTLE asked the Minister of Health the number of cases and deaths hitherto notified in the present outbreak of typhoid fever in the county of Somerset; and whether the cause had now been traced.—Sir KINGSLEY WOOD replied: 36 cases, 4 of them I regret to say fatal, have been confirmed. The source of the outbreak has not yet been determined.

Nutritive Value of Margarine

Major CARVER asked the Minister of Health whether, in view of recent criticism of non-vitaminised margarine, any investigation had been carried out by his department into the nutritive value of margarine that had or had not been vitaminised; and whether he proposed to take any action in the matter.—Sir KINGSLEY WOOD replied: No special investigation by my department has been made or is contemplated at present. The matter has already been considered by the Advisory Committee on Nutrition, who have recommended that, where margarine is used, it should be vitaminised, and this recommendation has been conveyed to local authorities.

Discharges from Mental Defective Colonies

Mr. KELLY asked the Minister of Health the number of patients discharged by the Board of Control from colonies for the mentally defective during 1936 and 1937.—Sir KINGSLEY WOOD replied: The number of patients discharged by the Board of Control from certified institutions under the Mental Deficiency Act, 1913, were: 152 in 1936, and 200 in 1937.

Physique of Naval Recruits

Mr. KIRBY asked the First Lord of the Admiralty the number of Liverpool men who presented themselves for enlistment into the Royal Navy during the year 1937, and the number who were rejected by reason of their poor physique during the same period.—Mr. DUFF COOPER replied: The number of candidates who applied for entry in the Royal Navy at the Liverpool Headquarters Recruiting Office during 1937 is 2439, and the number rejected over the same period, for the reason that they were below the physical and medical standard required, is 1137.

The Sale of Poisons

Sir ERNEST GRAHAM-LITTLE asked the Home Secretary whether his attention had been drawn to the recent case at Croydon where an unqualified person was fined for selling certain tablets containing poison, and it was shown that he had acted in ignorance of the contents due to the fact that the tablets had been supplied by a wholesaler without any warning; and whether he would consider the desirability of making regulations placing upon wholesalers the responsibility of refraining from selling preparations containing poison to persons other than qualified chemists.—Sir SAMUEL HOARE replied: My attention has been called to reports in the press of two recent cases at Croydon in which keepers of drug-stores were convicted for selling a poison contained in Part I of the Poisons List, though the reports which I have seen do not altogether bear out my hon. friend's description of the circumstances. As regards the second part of the question, I would point out that the Act itself provides for the sale of certain poisons by persons other than chemists; and I do not think that it would be practicable to place upon wholesalers the responsibility for ensuring that the retailers to whom they supply poisons are, in fact, entitled to re-sell them. Wholesalers are required to label the containers of poisons with the name of the poison and certain other particulars, and so far as the present cases are concerned, I understand that this requirement was complied with.

Yellow Blackboards for Schools

Sir NICHOLAS GRATTAN-DOYLE asked the Parliamentary Secretary to the Board of Education whether his attention had been drawn to a report of an investigation by the National Institute of Industrial Psychology to the effect that the use of yellow blackboards with blue chalk was to be preferred to those at present in use; and whether he proposed to make any recommendation to local education

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authorities in the matter.—Mr. LINDSAY replied: The question of the adoption of the recommendations of the report is one for the consideration of the authorities responsible for the schools.

MONDAY, FEB. 14TH

Anti-Epidemic Assistance in China

Mr. MATHERS asked the Secretary of State for Foreign Affairs whether the English-speaking group led by Dr. R. C. Robertson, appointed under the League of Nations plan of anti-epidemic assistance to China, had been fully constituted, and when it will proceed to China.—Mr. EDEN replied: The English-speaking group has been constituted under the leadership of Dr. Robertson, and is already in China.

Medical History of ex-Service Men

Mr. ORR-EWING asked the Minister of Pensions whether in future the full medical history of an ex-Service man whilst in any of the Services could be supplied to his medical adviser if such a man made a written request to that effect.—Mr. H. RAMSBOTHAM replied: The Service records are confidential. I could not, therefore, adopt this suggestion which would, in any event, involve a greater amount of labour that I should be justified in undertaking. It is, however, the practice of the Ministry to welcome any reasoned statement in support of the claim from the man's own medical adviser and I am always ready to give him an opportunity to discuss the case with a medical officer of the Ministry in his area.

Dairy Research and Nutrition

Captain ARTHUR EVANS asked the Minister of Agriculture when the report of the Milk Nutrition Committee would be published, including the result of the investigation conducted by the National Institute of Dairy Research on the feeding of calves on raw and pasteurised milk.—Mr. MORRISON replied: The Milk Nutrition Committee have already published one report dealing with experiments on rats at the National Institute for Research in Dairying, Reading, and at the Rowett Institute, Aberdeen. I understand that two further reports, dealing respectively with the work at these two institutions on the feeding of calves on raw and pasteurised milk and with an investigation into the effect of dietary supplements of raw and pasteurised milk on the growth and health of school-children, are in preparation and should be published shortly. The committee then propose to issue a final report dealing with their inquiries as a whole.

TUESDAY, FEB. 15TH

Report on Workmen's Compensation

Mr. CASSELLS asked the Home Secretary if he had yet received the Stewart committee's report on workmen's compensation; and, if so, was it intended that full copies of the evidence given and findings thereon would be available to Members of this House.—Mr. GEOFFREY LLOYD replied: This report is, I understand, being published to-day. It is not intended to publish the notes of evidence but hon. Members will find that the report contains detailed indications of the evidence as well as the committee's conclusions.

Tubercle-free Herds in Scotland

Mr. ROBERT GIBSON asked the Secretary of State for Scotland if he would explain why the county of Ayr had as many as 338 attested tubercle-free herds out of a total of 1618 registered herds, while the county of Renfrew had only 30 out of a total of 444, and the county of Midlothian only 10 out of a total of 271, respectively, the percentages being 21, 6·7, and 3·7; what were the number of cows in the said attested and registered herds, respectively; and what proposals he had with a view to increasing the number of tubercle-free herds in the counties of Renfrew and Midlothian, respectively.—Mr. ELLIOT replied: The high percentage of dairy herds attested as free from tuberculosis in the county of Ayr as compared with the counties of Renfrew and Midlothian is due to the greater response which has been made by herdowners in that county to the inducements offered by the Attested Herds Scheme as well as to the fact that dairying is generally more specialised and is of particular importance in Ayrshire. With regard to the last part of the question I would draw the hon. Member's attention to Part IV of the Agriculture Act, 1937, which confers extended powers upon my right hon. friend the Minister of Agriculture and Fisheries to initiate schemes for the eradication of bovine tuberculosis in Great Britain. These powers will come into operation at an early date. The numbers of cows in attested herds in the counties of Ayr, Renfrew, and Midlothian were respectively estimated at 10,834, 886, and 475 at Jan. 31st, 1938. The exact numbers of cows in registered herds in the same counties are not available but are estimated to be 47,000, 11,000, and 6500 respectively.

Dust Carts and Street Noises

Mr. ROBERT GIBSON asked the Minister of Health how many municipalities and other local authorities, respectively, there were under his supervision; how many of these, respectively, had dust carts with rubber wheels; and if he would consider taking steps to extend the use of such dust carts with the object of reducing the volume of street noises when the average citizen was asleep.—Mr. BERNAYS replied: There are 412 municipalities and 1083 urban and rural district councils. The great majority of the dust carts of these authorities already have rubber wheels and the use of them is still growing. My right hon. friend has no power to require their general adoption, but if the hon. Member has a particular case in mind and will supply me with the details, I shall be happy to communicate with the local authority concerned.

Public Health Services on Tyneside

Mr. DAVID ADAMS asked the Minister of Health what further steps he proposed to take with respect to the reports of the Royal Commission upon Tyneside local government.—Mr. BERNAYS replied: Following the conference held at Newcastle on Dec. 16th last, letters were sent to the Northumberland county council and the Newcastle city council suggesting informal exploration by the two authorities of the possibility of coördinating public health medical services. The city council have agreed to appoint a committee to consider the matter, and the county council will have the subject before them this week.

Appointments

BAXTER, A. B., M.R.C.S. Eng., Resident Medical Officer at the Infants Hospital, Vincent-square.

DOBERTSHAW, A. L., L.R.C.P. Edin., Resident Junior Assistant Medical Officer at the County Mental Hospital, Whittingham, Preston.

FIRTH, ERNEST, M.B. Manch., Medical Superintendent at the Ransom Sanatorium and Sherwood Village Settlement, Nottinghamshire.

FISHER, T. N., M.B. Manch., M.R.C.P. Lond., D.P.H., Hon. Assistant Physician for Children to the Manchester Northern Hospital.

HUBERT, W. H. DE B., B.A. Camb., M.R.C.S. Eng., Assistant Physician to the Department of Psychological Medicine at St. Thomas's Hospital.

NICHOLSON, B. C., M.D. Camb., M.R.C.P. Lond., D.P.H., Hon. Assistant Physician to the London Homœopathic Hospital.

STANDRING, THOMAS, M.D. Lond., D.P.H., Assistant Medical Officer of Health for Willesden.

THOMAS, F. B., M.B. Camb., F.R.C.S. Eng., Resident Surgical Officer at the Cardiff Royal Infirmary.

Births, Marriages, and Deaths

BIRTHS

SHARP.—On Feb. 12th, the wife of Dr. L. W. Sharp, of Wadhurst, Sussex—a daughter.

DEATHS

SHARPLEY.—On Feb. 12th, at Beechwood, Guernsey, John Ernest Sharpley, M.R.C.S., late of Kirton Lindsey, Lincs, aged 71.

SHAW.—On Feb. 14th, at St. Lawrence, Isle of Wight, George Henry Shaw, M.B. Glasg.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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MEDICAL NEWS

University of Oxford

Applications are invited for a Schorstein research fellowship in medical science.

The fellowship will be of the value of £300, and will be tenable for one year in any medical department or institute at Oxford. Candidates must be graduates of the university, hold a registrable medical qualification, and be under 35 years of age on Oct. 1st. Applications must be submitted to the dean of the medical school, University Museum, not later than May 2nd.

University of London

The following have been appointed staff examiners for medical degrees for 1938 :—

Anatomy.—Prof. C. M. West and Prof. J. E. S. Frazer.
Forensic Medicine and Hygiene.—Dr. J. H. Ryffel, Dr. W. H. Grace, Dr. G. F. Buchan, and Prof. W. W. Jameson.
Medicine.—Prof. Arthur Ellis, Sir Charles Wilson, Prof. W. H. Wynn and Dr. C. M. Hinds Howell; Prof. O. L. V. de Wesselow, Dr. George Hall, Dr. E. A. Cockayne, and Dr. K. Shirley Smith (associate examiners).
M.D. Hygiene.—Sir William Savage, Prof. M. Greenwood, F.R.S.; and Dr. William Gunn (additional examiner).
Neurology.—Dr. Macdonald Critchley and Dr. Antony Feiling.
Obstetrics and Gynæcology.—Prof. F. J. Browne, Mr. Frank Cook, Prof. J. McGibbon, Dr. J. M. Wyatt, and (if required) Mr. F. W. Roques; Mr. J. E. Stacey, Mr. R. A. Brews, Mr. Malcolm Donaldson, Mr. D. W. Roy, and (if required) Mr. D. H. MacLeod (associate examiners).
Ophthalmology.—Mr. C. B. Goulden, and Mr. R. Foster Moore.
Oto-Rhino-Laryngology.—Mr. W. M. Mollison and Mr. W. G. Howarth.
Pathology.—Prof. J. Shaw Dunn, Prof. W. W. C. Topley, F.R.S.; Prof. J. H. Dible and Dr. R. W. Scarff (associate examiners).
Pharmacology.—Prof. W. J. Dilling and Dr. V. J. Woolley.
Physiology.—Prof. H. P. Gilding and Prof. Winifred C. Cullis.
Psychological Medicine.—Dr. R. D. Gillespie and Dr. N. G. Harris.
Surgery.—Prof. J. Paterson Ross, Prof. P. T. Crymble, Mr. C. Jennings Marshall, Mr. C. E. Shattock, and (if required) Mr. C. W. G. Bryan; Mr. Julian Taylor, Prof. Lambert Rogers, Mr. A. C. Perry, Mr. R. H. Boggon, and (if required) Mr. Stanford Cade (associate examiners).
Tropical Medicine.—Dr. N. Hamilton Fairley.

Prof. G. E. Gask has been appointed a governor of Westminster Hospital in place of Mr. W. G. Spencer, who has resigned.

On Thursday, March 10th, at 5 P.M., at University College, Gower-street, W. C., Prof. P. E. Verkade, who holds the chair of chemistry and chemical technology in the Nederlandsche Handelshoogeschool at Rotterdam, will lecture on the rôle of dicarboxylic acids in metabolism. Dr. J. W. Trevan will give three lectures on variation in the response of animals to drugs at the Wellcome Institute for Medical Research, Euston-road, N.W., on dates to be announced later. These lectures will be open to all.

The Laura de Saliceto studentship for 1937–39 has been awarded to Mr. F. L. Warren, a Halley Stewart fellow working at the research institute of the Royal Cancer Hospital (Free).

University of Sheffield

Prof. H. S. Raper, F.R.S. (Manchester), has been appointed external examiner in pharmacology for Ph.D. theses in the faculty of medicine.

Hospital Almoners' Association

The annual dinner of this association took place on Feb. 5th, when Miss A. S. Macintyre presided. Sir Farquhar Buzzard, regius professor of medicine at Oxford University and president of the Institute of Hospital Almoners, in proposing the toast of The Association, spoke of the days before the introduction of almoners into the hospital and the difference that their coming had made to medical work. He spoke also of the future development and extension of this work and the possibility of the collected experience being a valuable contribution to sociological research. Mrs. A. W. Tomkins, assistant almoner at St. Thomas's Hospital, replied for the association. Mr. H. Chitty, hon. surgeon to the Bristol Royal Infirmary, replied to the toast of The Guests, proposed by Miss M. Streatfield, assistant secretary of the Institute.

Royal College of Surgeons of England

A meeting of the council of the College was held on Feb. 10th, with Sir Cuthbert Wallace, the president, in the chair. The Hallett prize was presented to Mr. Bertram Alfred Edward Johns.

At the recent primary examinations for the F.R.C.S. held overseas the following results were reported: At Melbourne, 17 out of 35 candidates were successful; at Sydney, 3 out of 6; at Dunedin, 7 out of 14; at Bombay, 11 out of 76; and at Cairo, 5 out of 15.

Mr. Sampson Handley and Mr. Graham Simpson were appointed as representatives on the Committee on the Geographical Distribution of the Industrial Population. Mr. Eardley Holland was reappointed representative on the Central Midwives Board.

The following hospitals of the Middlesex county council were recognised for the six months' surgical practice required of candidates for the final fellowship examination:

Central Middlesex Hospital, Acton-lane, Willesden (resident assistant medical officer (surgical) and junior resident A.M.O. (surgical));
North Middlesex Hospital, Silver-street, Edmonton (two A.M.O.'s and two junior A.M.O.'s with surgical duties); and
West Middlesex Hospital, Isleworth, Middlesex (two A.M.O.'s with surgical duties).

Diplomas of fellowship were granted to Frederick Charles Durbin of St. Thomas's Hospital, and Denis Frederic Ellison Nash of St. Bartholomew's Hospital, and diplomas of membership to those candidates mentioned as receiving the licence of the Royal College of Physicians in our issue of Feb. 5th. Diplomas in medical radiology were granted, jointly with the Royal College of Physicians, to D. M. Harper, Thomas Lodge, and J. T. McGinn.

On Feb. 28th and on March 7th and 14th Dr. L. W. Proger will describe recent additions to the museum. On March 4th, 11th, and 18th Dr. A. J. E. Cave will lecture on the anatomy of the tongue, the diaphragm, and the skin respectively. The lectures which are open to advanced students and medical practitioners will be held at the College, Lincoln's Inn-fields, London, W.C., at 5 P.M.

Health of Busmen

After the strike of London omnibus-workers last spring the court of inquiry recommended that further investigation should be made into conditions of work and their effect on the health of the men (*Lancet*, 1937, **1**, 1233; 1937, **2**, 87). A committee has now been appointed with two representatives of the Medical Research Council (Sir David Munro, F.R.C.S.E., and Mr. A. Bradford Hill, D.Sc.), two representatives of the London Passenger Transport Board, and two representatives of the Transport and General Workers' Union. The chairman is Mr. John Forster.

International Leprosy Conference

The fourth International Leprosy Conference is to be held in Cairo from March 21st to 28th. The first conference was held in Berlin in 1897, the second in Bergen in 1909, and the third in Strasbourg in 1923. A representative leprosy conference was also held in the Philippines under the ægis of the Leonard Wood memorial fund, in January, 1931, and this conference led to the foundation of the International Leprosy Association. The following subjects will be discussed at the Cairo conference: geographical distribution and statistics; clinical types and classification (including nature, diagnosis, and infectiousness of "tuberculoid" case; slight or early case); research (including cultivation and inoculation of the leprosy organism); general and special treatment; epidemiology (including influence of nutrition and hygienic conditions); methods of control (including voluntary and compulsory segregation); and miscellaneous (including rat and buffalo leprosy). It is expected that over one hundred non-official delegates from outside Egypt will attend the conference. Further information can be had from the hon. secretary-treasurer, International Leprosy Association, 131, Baker-street, London, W.1.

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Miss M. Reynolds has been appointed matron of the London Hospital.

Hunterian Society

On Monday, Feb. 28th, at 9 P.M., Sir Frederick Hobday, F.R.C.V.S., will deliver the Hunterian oration to this society at the Mansion House, E.C. He will speak on John Hunter—pioneer of veterinary science.

Institute of Psycho-Analysis

On Tuesdays, March 22nd, 29th, and April 5th at 8.30 P.M. Dr. Edward Glover will lecture at the Institute, 96, Gloucester-place, London, W., on gastric and circulatory disturbances.

Sydney Ringer Memorial Lecture

On March 8th, at 5 P.M., at University College Hospital medical school, Gower-street, London, W.C., Prof. J. H. Gaddum, Sc.D., will deliver the twelfth Sydney Ringer lecture. He will speak on ephedrine. Sir Henry Dale, F.R.S., will be in the chair, and the lecture is open to members of the medical profession and to medical students.

Medical Peace Campaign

The annual general meeting will be held on Saturday, Feb. 19th, at Friends House, Euston-road, London, N.W., at 5 P.M. Dr. Adrian Stephen will take the chair. A report of the first year's work will be given, and there will be a discussion on future activities.

German Radiological Congress

The twenty-ninth congress of the German Radiological Society will be held from July 4th to 7th at Munich under the presidency of Dr. G. A. Weltz. Further information may be had from Prof. Karl Frik, Brückenallee 22, Berlin, N.W.87.

Course in Psychological Medicine

The second part of the course of instruction for the D.P.M. which is being given at the Maudsley Hospital, will begin on Feb. 28th. Further information may be had from Prof. F. Golla, hon. director of the medical school at the hospital, Denmark-hill, S.E.5.

Grenfell Association

On Tuesday, Feb. 22nd, at 3 P.M., Dr. C. H. Forsyth, who has been working for this association since 1931, will give a lantern lecture on medical work in Labrador and North Newfoundland. He will speak in the assembly hall of the Royal Empire Society, Northumberland-avenue, London, W.C., at 3 P.M., and there will be a collection for the work of the association.

Coördination of Newcastle Hospitals

The newly formed Newcastle Hospitals' Joint Advisory Board, representing the municipality, voluntary hospitals and King's College, was approved on Feb. 12th. The Board is to advise the constituent bodies on all matters affecting the hospital services of the city, both municipal and voluntary, so as to promote the best use of the available facilities in an efficient service for the city as a whole. They in their turn will consult with the Board when major issues are involved in any proposed action. Matters to be discussed include the provision of new in-patient, out-patient and casualty facilities and new bed accommodation, buildings, and equipment; the principles underlying the medical and surgical staffing of the hospitals concerned; financial arrangements between municipal and voluntary hospitals for services undertaken; and medical education and research. Lord Eustace Percy, rector of King's College, was elected chairman of the Board, and the personnel is as follows:—

City council: ten members and Dr. J. A. Charles, the medical officer of health.
King's College: Prof. R. Bramble Green, Sir Robert Bolam, and Mr. H. B. Saint, F.R.C.S.
Royal Victoria Infirmary: Sir Ralph Mortimer, Prof. W. E. Hume, Mr. F. C. Pybus, F.R.C.S. Dr. S. Whately Davidson, Mr. W. Cook, and Mr. J. H. Burn.
Hospital for Sick Children: Dr. W. MacMurray.
Princess Mary Maternity Hospital: Prof. R. P. Ranken Lyle.
Eye Hospital: Mr. L. H. Booth.
Throat, Nose, and Ear Hospital: Mr. S. Phillips.
Rabies' Hospital and Mothercraft Centre: Dr. J. C. Spence.

In setting up this joint Board, Newcastle has followed the example of a number of other big provincial centres such as Manchester and Liverpool.

Medical Diary

February 21st to February 27th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY.
Medicine. 8.30 P.M., Dr. R. A. McCance, Dr. R. S. Aitken, and Dr. C. L. Cope: Mineral Salts in Therapy.
WEDNESDAY.
Comparative Medicine. 4.30 P.M., laboratory meeting at the Royal Veterinary College, Camden Town, N.W.
THURSDAY.
Urology. 8.30 P.M., Mr. John Sandrey: Calcification of the Genito-urinary Organs. Mr. G. Y. Feggetter: Anomalous Symptoms in Some Genito-urinary Conditions.
FRIDAY.
Disease in Children. 5 P.M. (Cases at 4.15 P.M.), at the Infants Hospital, Vincent-square, S.W. Dr. Mary Wilmers: Severe Gastro-enteritis. Dr. A. Maitland-Jones: (1) Hemiplegia. Dr. K. H. Tallerman and Mr. David Levi: (2) Duodenal Atresia. Mr. David Levi: (3) Local Gigantism Involving Webbed Fingers. Dr. Charles Harris: (4) Dumb-bell Tumour—Deep X Ray Therapy—Scoliosis. Dr. R. W. B. Ellis: (5) Green Teeth following Icterus Gravis Neonatorum. Dr. A. G. Signy: (6) Graphs showing Response of Red and White Blood Cells to Adrenaline.
Epidemiology and State Medicine. 8.15 P.M., Dr. J. A. H. Brincker and Dr. W. Gunn: The Epidemiology and Prophylaxis of Measles.

MEDICO-LEGAL SOCIETY.
THURSDAY.—8.30 P.M. (26, Portland-place, W.), Dr. Gerald Slot and Mr. B. A. Levinson: The Status, Scope, and Legal Position of the Unqualified Practitioner.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASE.
FRIDAY.—8.30 P.M. (11, Chandos-street, W.), Dr. I. N. Orpwood Price and Dr. T. E. Osmond: Relationship of the Gonococcal Complement-fixation Test to the Diagnosis and Treatment of Gonorrhœa.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Thornhaugh-street, W.C.
Maternity and Child Welfare Group.
FRIDAY.—5.30 P.M., Dr. Ethel Cassie: Children Living Apart from their Parents, including the "Daily Minded."

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY, 5, Lisle-street, W.C.
WEDNESDAY.—4.30 P.M., clinical cases. 5 P.M., Dr. W. D. Winnicott: Skin Changes in Relation to Emotional Disturbances.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.
THURSDAY.—5 P.M., Dr. B. E. Schlesinger: The Public Health Aspect of Heart Disease in Childhood. (First Milroy lecture.)

UNIVERSITY OF BIRMINGHAM.
THURSDAY.—4 P.M., Sir Henry Dale, F.R.S.: Transmission by Acetylcholine at Ganglionic Synapses and Nerve-Endings in Voluntary Muscle. (Second William Withering lecture.)

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland-place, W.
WEDNESDAY.—3.30 P.M., Dr. Agnes Savill: National Health in Relation to Artistic Pursuits.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Prof. J. H. Dible: The Pathology of Certain Respiratory Diseases (2). 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Dr. Dorothy Russell: Tumours of the Central Nervous System and Meninges.
THURSDAY.—2.15 P.M., Dr. Duncan White: Radiological Demonstration. 2.30 P.M., Mr. L. R. Broster: The Surgical Application of Endocrinology. 3.30 P.M., Dr. A. A. Moncrieff: Feeding of the New-born Infant—Care of the Premature Infant.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology).
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY.—3.30 P.M., Mr. G. Elmquist: Demonstration of Remedial Exercises.
TUESDAY.—3.30 P.M., Dr. Grainger Stewart: Spinal Compression.
WEDNESDAY.—3.30 P.M., Dr. F. M. R. Walshe: clinical demonstration.
THURSDAY.—3.30 P.M., Mr. Geoffrey Jefferson: Head Injuries.
FRIDAY.—3.30 P.M., Dr. J. St. C. Elkington: Acute Infectious Disease of the Brain.
Out-patient clinic daily at 2 P.M.

ST. GEORGE'S HOSPITAL, S.W.
THURSDAY.—5 P.M., Dr. Desmond Curran: psychiatric demonstration.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.
THURSDAY.—3 P.M., Prof. F. L. Golla: Epilepsy and the Electro-encephalogram.

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HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY.—2 P.M., Dr. Bertram Shires: X Ray Interpretation in Rickets, Scurvy, Tubercle, Syphilis. 3 P.M., Mr. Denis Browne: Causation of Some Congenital Deformities.
Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY.—4 P.M., Mr. Harold Kisch: Frontal Sinusitis—Diagnosis and Treatment.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL, N.W.
WEDNESDAY.—4 P.M., Mr. A. Clifford Morson: *Bacillus coli* Infections of the Genito-urinary Organs.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY to SUNDAY.—INFANTS HOSPITAL, Vincent-square, S.W., all-day course in infants' diseases.—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in skin diseases. (Open to non-members.)—F.R.C.S. (PRIMARY) COURSE IN PHYSIOLOGY: Mon., Wed., and Fri. at 5.30 P.M.—LONDON CHEST HOSPITAL, Victoria-park, E. Sat. and Sun., course in diseases of the heart and lungs.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W., Tues. and Thurs., 8 P.M., clinical and pathological M.R.C.P. course.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
TUESDAY.—5 P.M., Dr. H. Corsi: Diseases of the Nails.
THURSDAY.—5 P.M., Dr. A. Burrows: Malignant Conditions of the Skin. (Chesterfield lectures.)

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.
FRIDAY.—4.30 P.M., Dr. B. T. Parsons-Smith: Physical Medicine in Diseases of the Cardio-vascular System.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, S.W.
WEDNESDAY.—4 P.M., Mr. J. G. Yates Bell: Pyuria.

MANCHESTER ROYAL INFIRMARY.
FRIDAY.—4.15 P.M., Mr. R. L. Newell: demonstration.

ANCOATS HOSPITAL, MANCHESTER.
THURSDAY.—4.15 P.M., clinical meeting.

LEEDS GENERAL INFIRMARY.
TUESDAY.—3.30 P.M., Dr H. G. Garland: demonstration of neurological cases.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY.—4.15 P.M. (Royal Hospital for Sick Children), Mr. Matthew White: Surgical Cases.

Vacancies

For further information refer to the advertisement columns

Aberdeen City.—Regional M.O. for Maternity and Child Welfare, £850.
Albert Dock Hosp., Connaught-road, E.—Res. M.O., at rate of £110.
Bath and Wessex Children's Orthopædic Hosp., Combe Park.—H.S., at rate of £120.
Birmingham Children's Hosp.—Res. M.O., £175.
Birmingham City.—Temp. M.O. to Maternity and Child Welfare Dept., £10 per week.
Birmingham, Coleshill Hall.—Deputy Med. Supt., £500.
Birmingham, Maternity Hosp.—Res. M.O. and Reg., £200.
Birmingham, Selly Oak Hosp.—Jun. M.O., at rate of £200.
Bradford, Municipal General Hosp., St. Luke's.—H.P.'s and H.S.'s, each at rate of £150.
Bradford Royal Infirmary.—H.P., at rate of £150.
Braintree, Black Notley Sanatorium.—Jun. Asst. M.O., £250.
Brighton County Borough Mental Hosp., Haywards Heath.—Second Asst. M.O., £500.
Bristol Eye Hosp.—Jun. H.S., at rate of £100.
Cannock Urban District Council.—Asst. M.O.H. and Asst. School M.O., £550.
Carlisle, Cumberland Infirmary.—H.P., two H.S.'s, and H.S. to Spec. Depts., each at rate of £160.
Cassel Hosp. for Functional Nervous Disorders, Swaylands, Penshurst.—Locum Tenens, 8 guineas per week.
Central London Ophthalmic Hosp., Judd-street, W.C.—Sen. and Jun. H.S., £120 and £100 respectively.
Central London Throat, Nose, and Ear Hosp., Gray's Inn-road, W.C.—Third Res. H.S., at rate of £75.
Charing Cross Hosp., W.C.—Surg. Reg., £150.
Cheadle and Gatley Urban District Council.—M.O.H., £800.
Chesterfield and North Derbyshire Royal Hosp.—Cas. O. and Fracture H.S., at rate of £200.
Clapham Maternity Hosp., S.W.—H.S.
Devonport, Alexandra Maternity Home.—Hon. Consultant.
Doncaster Royal Infirmary.—Fracture H.S., at rate of £200.
Doncaster Royal Infirmary and Dispensary.—Cas. H.S., £175.
Dorset County.—Asst. County M.O. and M.O.H., £800.
Dreadnought Hosp., Greenwich.—H.P. and H.S., each at rate of £110.
Eastbourne, Royal Eye Hosp.—H.S., £100.
Edgware, Redhill County Hosp.—Physician, Grade I, £1000.
Exeter, Royal Devon and Exeter Hosp.—Res. Surg. O., £250. Also two H.S.'s, each at rate of £150.
General Lying-in Hosp., York-road, Lambeth, S.E.—Jun. Res. M.O., &c., at rate of £100.
Glasgow Corporation Mental Hosps.—Jun. Asst. M.O. for Hawkhead Mental Hosp., £300.
Great Yarmouth General Hosp.—H.S., £140.
Grocers Company.—Scholarship, £300.
Guildford, Royal Surrey County Hosp.—Hon. Surgeon and Gynæcologist. Also Hon. Surgeon.
Guildford, Warren-road Hosp.—Res. Asst. M.O., at rate of £250.
Harefield Sanatorium.—Jun. Res. Asst. M.O., at rate of £250.
Hertford County Hosp.—H.S., at rate of £200.
Hosp. for Diseases of the Skin, Blackfriars, S.E.—Clin. Assts. Also Member for Hon. Staff.
Huddersfield County Borough.—Asst. School M.O., £500.
Infants Hosp., Vincent-square, Westminster, S.W.—H.P., at rate of £100.
Isleworth, West Middlesex County Hosp.—Obstet. Surgeon, Grade II, £650. Also Res. Cas. M.O., at rate of £350.
Kingston County Hosp.—Res. Asst. M.O., at rate of £250.
Lancashire County Council.—Asst. County M.O., £800.
Leicester Royal Infirmary.—H.S. and H.P., each at rate of £125. Also Jun. Cas. O., at rate of £100.
Leigh Infirmary, Lancs.—Jun. H.S., at rate of £150.
Liverpool Royal Children's Hosp.—Res. M.O. for Heswall Branch, at rate of £120.
London County Council School Medical Service.—Asst. Aurist, 34*s.* 6*d.* per session.
London Hosp., E.—Physician. Also Asst. Physician.
London Jewish Hosp., Stepney Green, E.—Hon. Clin. Assts.
Maidstone, West Kent General Hosp.—H.S., £175.
Manchester, Ancoats Hosp.—Cas. O., £175.
Manchester, Booth Hall Hosp. for Children.—Asst. M.O., at rate of £200.
Manchester Royal Children's Hosp., Pendlebury.—Two Asst. M.O.'s to Out-patients' Dept., each at rate of £150.
Monmouthshire County Council.—Two Asst. M.O.'s, each £500.
Newcastle General Hosp.—H.S. and Jun. Clin. Asst. to Joint Committee's V.D. Clinic, £250.
Norfolk, Kelling Sanatorium, Holt.—Second Asst. Res. M.O., £350.
Northampton General Hosp.—H.S. to Ear, Nose, and Throat Dept., H.P., three H.S.'s, and two Cas. O.'s, each at rate of £150.
Plymouth City General Hosp.—Asst M.O., £300. Also Jun. Asst. M.O., at rate of £250.
Plymouth, Prince of Wales's Hosp., Greenbank-road.—Res. Anæsthetist and H.S. to Spec. Depts., at rate of £120.
Preston and County of Lancaster Royal Infirmary.—Res. H.S. to Maternity Hospital, and two H.S.'s, each at rate of £150.
Preston, Biddulph Grange Orthopædic Hosp.—Sen. and Jun. H.S.'s, at rate of £250 and £200 respectively.
Preston Hall Sanatorium, near Maidstone.—Asst. M.O., £250.
Prince of Wales's General Hosp., N.—Hon. Med. Reg., £100. Also Jun. H.P. and two Jun. H.S.'s, each at rate of £90.
Queen Mary's Hosp. for the East End, E.—Hon. Asst. Obstet. and Gynæcological Surgeon.
Queen's Hosp. for Children, Hackney-road, E.—H.P. and Ear, Nose, and Throat H.S., each at rate of £100. Also Clin. Asst. to Med. Out-patients, 5*s.* per attendance.
Redhill County Hosp.—Res. Asst. M.O., at rate of £250.
Richmond Royal Hosp., Surrey.—Res. M.O., £200. Also Sen. and Jun. H.S.'s, £150 and £100 respectively.
Royal Cancer Hosp., Fulham-road, S.W.—Second Asst. Pathologist, £250. Also H.S., at rate of £100.
Royal Eye Hosp., St. George's-circus, S.E.—Sen. H.S. and two Asst. H.S.'s, at rate of £150 and £100 respectively. Also Research Assts.
Royal Free Hosp., Gray's Inn-road, W.C.—Res. Cas. O., at rate of £150.
Royal London Ophthalmic Hosp., City-road, E.C.—Two Out-patient Officers, each £100.
Royal National Orthopædic Hosp., 234, *Gt. Portland-street, W.*—Two H.S.'s, each at rate of £150.
Royal Naval Dental Service.—Dental Officers.
Royal Naval Medical Service.—M.O.'s.
Royal Northern Hosp., Holloway, N.—Pathological Registrar, £200.
Ryde, Royal Isle of Wight County Hosp.—Jun. H.S., £120.
St. Bartholomew's Hosp., E.C.—Res. Asst. Physician-Accoucheur and Demonstrator of Practical Midwifery, £1052 10*s.* Also Dental H.S., at rate of £80.
St. Helens Hosp.—Jun. H.S., £150.
Salisbury General Infirmary.—H.S., at rate of £125.
Salvation Army Mothers' Hosp., Clapton, E.—Jun. Res. M.O., at rate of £80.
Seaton Valley Urban District Council, &c.—M.O.H., &c., £1100.
Stoke-on-Trent, North Staffordshire Infirmary.—H.S. and H.P., each at rate of £150.
Swansea General and Eye Hosp.—Asst. Pathologist, £500.
West London Hosp., Hammersmith, W.—H.P. and H.S., each at rate of £100.
Westminster Hosp., Broad Sanctuary, S.W.—Physician.
Worcester County and City Mental Hosp., Powick.—Asst. M.O., £350.
York County Hosp.—H.P., £150.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Almondsbury (Gloucester), Perth (Perth), Killin (Perth), Cullompton (Devon), Thame (Oxon).

CREMATION CONFERENCES.—The National Association of Cemetery and Crematorium Superintendents and the Federation of Cremation Authorities in Great Britain will hold their seventh joint conference at Edinburgh from June 27th to 30th. The first of a new series of annual conferences covering all aspects of cremation administration and propaganda will also be held under their auspices at Balliol College, Oxford, from July 22nd to 25th under the presidency of Lord Horder. The secretary of the conference may be addressed at 47, Nottingham-place, London W.1.

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NOTES, COMMENTS, AND ABSTRACTS

AN EIGHTEENTH CENTURY DIARY?

THE reader or reviewer of Knyveton's Diary [1] finds himself in a quandary. Is he to admit the claim of the editor that it represents, with certain stated alterations, an accurate transcription of a diary written in the middle of the eighteenth century by a medical student and naval surgeon; or is he to prefer the statement of the publisher's jacket that Mr. Gray has "reconstructed in diary form" the adventures of John Knyveton? We find it easier to accept the publisher's version. The form of the diary is something too coherent for the day-to-day scribblings of a man of the author's age and period; there are certain episodes, notably the meeting with Dr. Johnson, which fail to carry conviction; and the language, though skilfully contrived to convey an impression of the stated period, at times reveals an acquaintance with modes of thought and expression that are scarcely consonant with mid-eighteenth century usage. We shall therefore assume that the book represents the "reconstructed" adventures of "John Knyveton" in 1751–52; and with this assumption can heartily congratulate Mr. Gray on his achievement in giving us so vivid a tale of adventure nearly 200 years ago.

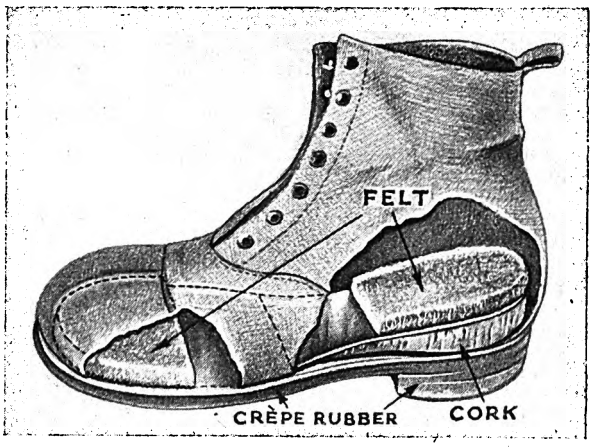
The story begins with the arrival of Knyveton from the country to pursue his medical education in London at a hospital, "Infirmary Hall," whose name is confessedly altered from its true form, for reasons that seem scarcely sufficient. However, the disguise is not particularly effective, if we are to assume that an actual hospital is named in the original diary. About half the book concerns this student period of Knyveton's life and gives a somewhat gruesome but fairly accurate account of medical studies in the London of the period. It includes stories of grave-robbing; of the conditions in which the patients lived in the wards; of the behaviour and character of his teachers, and of the conduct of the final examination which landed him in his twenty-second year as a surgeon's mate in the navy. The details are not, we think, calculated to arouse the interest or to excite the feelings of the non-medical reader (other than those of incredulity and disgust), but for the student of medical history there is much which will win his attention. The second half of the story is better suited for the general reader. It passes to the adventures of the surgeon's mate in his ship on a voyage to the West Indies, and is a rousing tale of experience and adventure in a period when Great Britain was not actually engaged in war, but when her navy was gradually rising to the conditions of seamanship and discipline which a little later were to triumph in all the oceans. But Knyveton did not lack the experience of a naval fight, for his ship was engaged in a furious and successful battle with a pirate; he underwent the hardships and perils of storm and privation; he had to deal with Yellow Jack, malaria, and other tropical diseases, and after nearly losing his life in what appears to have been an attack of acute malaria—brought on, as he hints, by "a sharp bite from one of those Dam'd Tiger Musketeers"—returned safely to England. He afterwards, according to his editor, served in various ships and in many different parts of the world, and spent altogether nine years in the navy. Then having saved some money he settled in practice in London and was appointed lecturer in midwifery to his old school, "Infirmary Hall." He married, had a family, and prospered in his profession, and died in his eightieth year in 1809.

There is so much circumstantial detail in the different parts of the story that we cannot refuse to believe that John Knyveton or a person to whom that name has been given, lived and kept a journal during these eventful years, but we also are compelled to believe that his diary, as here presented, has been transformed in the process of editing to a shape and substance which the original did not exhibit. However that may be this is a stirring and instructive narrative.

[1] The Diary of a Surgeon in the Year 1751–1752. By John Knyveton, Licentiate of the Society of Apothecaries; Doctor of Medicine of the University of Aberdeen; Teacher of Midwifery to and Man Mid-wife in Infirmary Hall; Surgeon's Mate, H.M.S. *Lancaster*. Edited and transcribed by Ernest Gray. London: D. Appleton-Century Company. Pp. 322. 10*s*. 6*d*.

A BOOT FOR USE WITH PLASTER-OF-PARIS

DR. NORMAN A. VERNON writes: "I have recently designed an inexpensive boot for use over plasters of the leg or foot whereby ambulatory treatment may be carried out without the discomfort and unpleasant appearance of walking on a plaster splint. The boot was made for me by Mr. Stallworthy, bootmaker, of Queensway, Petts Wood, Kent, and consists of a



black canvas upper, sewn to a thick crepe rubber sole (see Figure). The toecap is especially roomy and has a felt pad underneath the toes. In the heel is a detachable shaped cork 'lift' which is designed to fit the foot when the plaster fixes the ankle at a right angle. This boot may be worn during the treatment of many conditions and I have used it with great success in a fracture of the os calcis where the patient's leg and foot were in plaster up to the knee. He was able to attend his business right through the treatment and wore the boot for two months, thus preserving a presentable appearance and saving the plaster from damage and dirt."

A NEW AND A CHANGED CONTEMPORARY

THE ranks of medical journals have been augmented by the *Sphincter*, the organ of the Liverpool Medical Students' Debating Society. The name was, we understand, the best submitted in a competition; the contents are of higher standard. There are illustrated biographies of Dr. J. H. Dible, professor of pathology from 1929 until last year, and of Mr. R. Watson Jones, president of the society, a brief history of the Liverpool Royal Infirmary since its foundation in 1745, instructions on how to be happy though qualified, and a commendable suggestion that the society should discuss successively the various branches of the profession to aid the student in making his choice. The journal is to appear terminally and Liverpool men will welcome it.

The latest medical periodical to change its appearance is the *St. Bartholomew's Hospital Journal*. Old Bart.'s men probably had an initial shock when they saw that the familiar drawing of the Henry VIII gate to the hospital, which has appeared on the cover since the first issue 45 years ago, has been replaced by a bold plaque in modern style, executed by Mr.

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Eric Gill—in whose Perpetua fount the page has been lettered. A black-robed monk is represented comforting a pathetic figure vividly portraying pain. The inscription "M. Rahere ✣" may not be clear to those unaware of the prefix Marcus in the name of the hospital's founder. He left Henry I's court to become a canon of the order of St. Augustine, the black friars. The text in future issues of the journal will be in the sturdier Baskerville type. These superficial changes are but the exanthema of a deeper dissatisfaction with the policy as well as the style of former volumes, which has been evident for some time past. The aim is clearly to make the journal more of a student magazine than a serious medical periodical, though the greater part of the circulation—totalling some 2300 copies a month—is among the past rather than the present students. The value of the change depends on whether success is to be measured by popularity within the medical school or by reputation in the wider world of the whole profession. At present the journal is one of the few from the hospitals that appear in the *Quarterly Cumulative Index Medicus*.

MENINGO-ENCEPHALITIS AFTER RUBELLA

THE rarity of encephalitis as a sequel of German measles is shown by the fact that only 12 cases have been reported. Of 11 cases described by Merritt and Koskoff[1] the ages ranged from 5 to 33 years, most of the patients being under 15. Both sexes were equally attacked. The interval between the appearance of the rash and the onset of the nervous symptoms varied between two and six days. With a single exception where it was high the temperature was normal or only slightly raised at the onset of nervous symptoms—6 patients had headache, and nuchal rigidity and Kernig's sign were found in 4. The cerebro-spinal fluid was usually not under increased pressure. The cell count was raised, lymphocytes being predominant. Taylor[2] reports a case—the first in Australia—of a girl aged 18, who developed signs of meningo-encephalitis four days after the first appearance of the rash and died the same evening. The cerebro-spinal fluid was not under increased pressure and was sterile. The cells numbered 130 per c.mm. and were chiefly lymphocytes. The necropsy confirmed the diagnosis of meningo-encephalitis.

SWEDISH EXPERIENCE OF ZINC INSULIN AND ZINC PROTAMINE INSULIN

IN *Nordisk Medicinsk Tidskrift* for Jan. 8th Dr. Uno Carlborg reviews his experiences at Prof. Tillgren's hospital in Stockholm with zinc insulin and zinc protamine insulin. Since the beginning of 1936 some 90 in-patients and a score of out-patients have been treated with zinc insulin—a combination of insulin with zinc acetate, the maximum amount of this salt added to every 40 international units of insulin being 1 mg. Since April, 1937, about 60 in-patients and 20 out-patients have been treated with a Swedish version of zinc protamine insulin. Carlborg confirms earlier claims on behalf of zinc insulin that it has a delayed and prolonged action. The favourable subjective experiences of patients already familiar with the action of plain insulin were confirmed by the comparatively great stability of the blood-sugar curve under treatment with zinc insulin. Manual labourers found it a great advantage that the substitution of plain insulin for zinc insulin enabled them to avoid some at least of the inconveniences of an injection during work hours. For the same reason they found a certain advantage in beginning the day with an injection of zinc insulin at 5.30 A.M. In two cases in which large doses of zinc insulin were given, hypoglycæmic symptoms appeared, and the administration of milk or glucose by injection relieved the hypoglycæmic state only temporarily. In some cases a reaction at the site of injection was complained of when large doses were given, and a couple of patients complained of vague muscular pain and some anorexia after the injections. Apart from these comparatively small drawbacks, the results were considered encouraging. Even more encouraging were the experiences with zinc protamine insulin, whose action was found to last so long that in several cases the former two injections of insulin in the 24 hours could be replaced by a single injection of zinc protamine insulin. In several other cases three injections of plain insulin could be replaced by two injections of zinc protamine insulin. The only ill effects recorded were urticarial rashes, flushing of the face, and occasional swelling at the site of injection a few hours to a week after starting the treatment.

[1] Merritt, H. H., Koskoff, Y. D., *Amer. J. med. Sci.* 1936, 191, 690.
[2] Taylor, R. J., *Med. J. Aust.* 1937, 2, 604

FILMS OF SOUTH AFRICA.—Every Friday, between 5.15 and 6.30 P.M., sound films of South Africa, including one in colour, are displayed at South Africa House, Trafalgar-square, London, W.C.2. Tickets may be had from the publicity and travel bureau at that address (Tel.: Whitehall 4488).

VITAMIN-C OUTPUT IN DIET TREATMENT OF RHEUMATOID ARTHRITIS.—We are asked by Dr. E. C. Pillman Williams to state that two references to the work of L. J. Harris and his collaborators are given incorrectly in the paper on this subject by Dr. Dorothy Hare and herself published in our issue of Jan. 1st. In the text of p. 24 the dates referring to Harris's work have been reversed. In the list of references given at the end of the paper the fifth item (Harris, Passmore, and Pagel) should read: Abbasy, M. A., Harris, L. J., and Ellman, P. (1937) *Lancet*, 2, 181.

GROCERS' COMPANY SCHOLARSHIP.—The Grocers' Company is offering a scholarship for the encouragement of original medical research into the causation of prevalent disease or as to means of preventing premature death. Further particulars will be found in our advertisement columns.

NATIONAL ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS.—The 24th annual conference of this association will be held at B.M.A. House, Tavistock-square, London, W.C., on June 30th, July 1st and 2nd. The annual meeting of the care committees will be held on June 29th.

WORK OF DENTAL MECHANICS.—The British Dental Association, the Incorporated Dental Society, and the Public Dental Service Association have set up a joint committee, under the chairmanship of Mr. R. G. Heegaard Warner, chairman of council of the British Dental Association, to inquire into conditions of service, training, and wages of dental mechanics.

THE SHORTAGE OF NURSES.—The London County Council has decided to appoint an officer to coördinate the efforts of the various departments to secure suitable recruits for the Council's hospital nursing service. A descriptive pamphlet is to be issued, and an assistant superintendent of school nurses is to be seconded to visit schools and other educational establishments so as to make the service better known.

PORT REGIS PREPARATORY SCHOOL.—At this preparatory school two scholarships of £100 each are annually awarded to the sons of medical men. The school is at Broadstairs, Kent, and the scholarships were founded by Sir Milsom Rees. The next examination will be held at the beginning of March. Candidates must be under 9 years of age at the time of competing, and the scholarships are normally tenable till the holder leaves the school. The holders will be selected at an interview in London from among those boys who have done best in some simple examination conducted in or near their homes. Applications must be addressed immediately to the head master, Port Regis School, Broadstairs, from whom full particulars may be obtained.

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ADDRESSES AND ORIGINAL ARTICLES

PAROXYSMAL NOCTURNAL HÆMOGLOBINURIA OF THE MARCHIAFAVA TYPE

BY J. V. DACIE, M.B., M.R.C.P. Lond.
MEDICAL RESEARCH COUNCIL POST-GRADUATE STUDENT

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J. F. WILKINSON, M.D., M.Sc., Ph.D. Manch., F.R.C.P. Lond., F.I.C.
PHYSICIAN IN CHARGE AND DIRECTOR OF THE DEPARTMENT; HON. CONSULTING HÆMATOLOGIST, CHRISTIE CANCER HOSPITAL AND HOLT RADIUM INSTITUTE, MANCHESTER

PAROXYSMAL nocturnal hæmoglobinuria associated with chronic hæmolytic anæmia is a rare condition of great interest. It was first described by Marchiafava and Nazari in 1911 and has since received most attention from Italian writers who have termed it "hæmoglobinuria of the Marchiafava type."

Its characteristic features are:—

(1) An anæmia of a chronic hæmolytic type in which the red cells are often reduced below 2 million per c.mm., reticulocytosis is found over long periods, and nucleated red cells may be seen in the peripheral blood. Jaundice is usually present.

(2) Persistent hæmoglobinæmia.

(3) Hæmoglobinuria which is most severe at night. The specimens passed at night or first thing in the morning are often very dark, whereas those later in the day are of normal colour—although they may give a positive benzidine reaction. At other times there will be only a trace of blood in the morning and none in the afternoon sample. This hæmoglobinuria is intermittent and the free periods often last many weeks. The attacks are not related to exposure to cold.

(4) Persistent hæmosiderinuria, which is detected by the Prussian-blue test, and is notable since it is present even when there is no hæmoglobinuria.

The anæmia shows fluctuations corresponding to the severity of the hæmoglobinuria, and recovery of the blood level is liable to be slow after the hæmoglobinuria has ceased.

Hamburger and Bernstein in 1936 reviewed the clinical features in detail, quoting 22 recorded cases and 2 of their own; Witts (1936) has also mentioned a case and given references to 12 others. It appears that treatment, including splenectomy, has been of little permanent value.

The appearances at autopsy are those characteristic of long-continued excessive intravascular hæmolysis, but little is known about its mechanism. Serological examinations have seldom been done under conditions that would make them of real diagnostic value; consequently retrospective diagnosis is very unreliable, and it is not at all certain that all the reported cases are examples of the same disease.

Investigation of the typical case here described has enabled us to demonstrate a definite abnormality that offers some explanation of the clinical and pathological features.

CASE-HISTORY

A married woman, aged 34, was admitted to another hospital in July, 1933, complaining of anæmia, jaundice, and the passage of "black" urine. Her condition proved refractory to any treatment but she gradually improved and was discharged seven months later. After another six months she was again jaundiced, passed "black" urine, and was in hospital eleven weeks. As before, she slowly recovered and she remained well until June, 1936, when she had her third similar attack and was referred to the Manchester Royal Infirmary. She said that the attacks were sometimes heralded by pain in the right side of the abdomen and the chest; between attacks she was quite well. Her appetite was good, her bowels were regular, and menstruation, which was regular and normal, was unrelated to the "black" urine. Her weight was steady. No member of her family had been similarly affected or had had anæmia; apart from housework she had worked only as a cardroom operative.

No unusual physical signs were found; the spleen was not palpable and the liver not enlarged; the urine (July 3rd, 1936) contained no blood or blood pigment. A blood count showed: red cells, 2,760,000 per c.mm.; hæmoglobin, 72 per cent.; colour-index, 1·30; white cells, 6000 per c.mm. (polymorphonuclears 50·5 per cent., lymphocytes 45·5 per cent., monocytes 4 per cent., eosinophils, basophils, and nucleated red cells absent); aniso- and poikilo-cytosis; platelets moderate in numbers; reticulocytes, 3 per cent. The Wassermann reaction was negative; a van den Bergh test showed an indirect positive reaction and the blood contained 0·6 mg. bilirubin per 100 c.cm. The fragility of the red cells was within the normal range. Fractional gastric analysis showed free acid in all samples with a maximum of 32 units at 2½ hours.

In September, 1936, there was a similar attack, but the urine remained clear until Oct. 3rd when it was dark on three successive mornings, although normal at other times of the day. Spectroscopy showed methæmoglobin, while no red cells could be detected in the urinary deposit. On Oct. 30th the morning urine was again dark and the patient, who felt very weak, was admitted to the Manchester Royal Infirmary. There was anæmia (red cells, 3,070,000; hæmoglobin, 70 per cent.) with reticulocytosis (12·8 per cent.); the blood contained 1·4 mg. bilirubin per 100 c.cm. and spectroscopy of the serum showed bands corresponding to methæmoglobin. The fragility of the red cells by Whitby and Hynes's method was within normal limits. The mean cell volume was 105·7 c.μ and the Price-Jones curve gave a mean red cell diameter of 6·77 μ, with microcytosis 7 per cent. and megalocytosis 0·2 per cent.

From Nov. 3rd to 10th the dark colour of the morning specimen of urine was in striking contrast with the yellow or orange colour of urine passed in the rest of the day, which did not always give a positive reaction with benzidine. The hæmoglobinuria ceased altogether after two weeks. Cystoscopy showed a normal bladder, but there appeared to be slight delay in the phenolsulphonphthalein excretion. Radiograms showed unusually well-defined kidney shadows (? due to hæmosiderosis).

She was readmitted to hospital on May 3rd, 1937, with a similar attack from which she recovered after three weeks. On May 29th morning hæmoglobinuria was again noted and continued for a fortnight. Although the fragility of the red cells was within the normal range, the presence of a slight degree of spherocytosis did not exclude the possibility that the condition was an atypical spherocytic (hæmolytic) jaundice and accordingly splenectomy was done by Mr. Wilson Hey on July 24th. The spleen, which appeared of normal size (120 grammes) and was removed without difficulty, showed hyperplasia of the reticulum cells and some excess of fibrous tissue; the Malpighian bodies were small. Before the splenectomy the red cell fragility had been examined by Dacie and Vaughan's (1938) modification of

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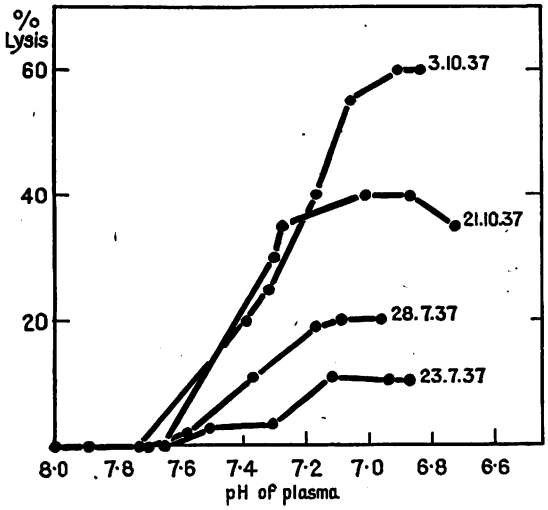
Creed's method, and found to be within the normal range.

The patient made a good recovery, although for four days after the operation there was continuous hæmoglobinuria. Hæmatologically, improvement was certainly not dramatic; nevertheless since the operation she has gradually improved and has so far had no further attacks of hæmoglobinuria. Iron has been almost constantly demonstrable in the urinary deposit by the Prussian-blue reaction (so-called hæmosiderinuria). It is not necessarily associated with hæmoglobinuria, for it was present in the day urine, when the hæmoglobinuria was strictly nocturnal, and it was still to be found on Nov. 18th, 1937, although there had been no hæmoglobinuria since the beginning of August. The pigment is probably derived from hæmoglobin which the kidney is constantly excreting in small quantities, and which is precipitated as hæmatin by the acid urine.

SEROLOGICAL INVESTIGATIONS

In pursuing the reason for this hæmoglobinæmia and paroxysmal hæmoglobinuria, we have made



Relationship between *p*H of plasma and autohæmolysis on different dates.

many serological experiments to be reported in detail elsewhere. The cardinal finding has been the occurrence of autohæmolysis in vitro under certain conditions which may be summarised as follows:—

(1) Using whole heparinised or defibrinated venous blood, kept under paraffin, lysis was noticed when the samples were kept at 37° C., and usually occurred within an hour of collection.

(2) The onset was determined by the "venosity" of the blood; lysis did not take place if the sample had been deliberately aerated, and on one occasion the omission of a covering layer of paraffin sufficed to prevent noticeable lysis.

(3) Lysis was observed when the patient's cells, previously washed in physiological saline solution, were added to her own plasma (or serum) but only if the *p*H of the plasma was adjusted to physiological limits (as below) by the addition of M/15 potassium dihydrogen phosphate, N/20 hydrochloric acid, or 0·6 per cent. lactic acid. To illustrate this a series of *p*H-lysis curves obtained on different occasions are shown in the accompanying Figure. It will be noted that lysis was maximal at a *p*H of about 7·0, and completely absent above 7·7. To obtain lysis with the above technique it is therefore imperative to adjust the *p*H to within the physiological range, for the *p*H of plasma may rise to approximately 7·7–7·8 unless precautions are taken to prevent loss of carbon dioxide. No lysis, however, was noticed in the absence of plasma if the cells were suspended in physiological saline solution at a *p*H of 6·9.

(4) Using a suspension of washed red cells in buffered plasma (*p*H 7·1) maximum lysis was obtained when the cell suspension was first cooled to below 5° C. for fifteen minutes and then warmed to 37° C. for 2–3 hours; at most only a trace of lysis was noticed if cooling was omitted. On the other hand, when whole blood was used, preliminary cooling was definitely unnecessary. A possible explanation of this discrepancy is that although the lytic agent present in the plasma ("lysin") is adsorbed by red cells at 37° C. this more readily happens at a lower temperature, the optimum being below 10° C. It may be that during "washing" the lysin previously adsorbed on to the cells is lost in the process, with the result that when they are later added to the plasma at 37° C. the final amount adsorbed by any red cell is insufficient to produce lysis. Our results indicate that the higher the concentration of "lysin" the more easily will this take place at 37° C.

(5) Alterations in *p*H probably largely affect the actual adsorption of lysin by the cells themselves; Osburn (1934) has shown that the effect of *p*H upon the action of hæmolytic complement between the limits involved in our experiment (6·8–8·0) is small enough to be neglected.

(6) The "lysin" itself is thermolabile, for after plasma had been heated to 56° C. for half an hour the addition of complement did not reactivate it; moreover, such plasma added to red cells which had previously been allowed to adsorb lysin proved completely inhibitory to subsequent lysis. The addition of complement to a system containing unheated patient's plasma and red cells did lead to increased lysis.

(7) From our experiments the abnormality responsible for autohæmolysis in this patient with paroxysmal nocturnal hæmoglobinuria seems to be in the red cells themselves. Substitution of normal plasma and serum of the same group (AB) for that of the patient did not prevent lysis. No differences of *p*H or temperature requirements were observed when such plasma was used instead of that of the patient. On the other hand, when "washed" normal cells were added to the patient's plasma and serum no lysis took place.

(8) The titre of the "lysin" is apparently low, the maximum observed being 1:3. When plasma and washed cells are used there seems to be an inverse relationship between the ease with which in-vitro autohæmolysis can be demonstrated, and the severity of the in-vivo hæmolysis. With a gradual improvement in our patient's health (a rising hæmoglobin percentage, a falling reticulocyte count, and the absence of hæmoglobinuria) it has been increasingly easy to demonstrate autohæmolysis with an apparent widening of the *p*H-lysis curve. In fact after splenectomy, when for a few days intravascular lysis was rapid enough to produce continuous hæmoglobinuria, the demonstration of lysis using washed cells in vitro was exceedingly difficult. Using whole venous blood this relation is reversed; when our patient was most severely ill, obvious lysis could be seen after 15–30 minutes at 37° C.; but when she was clinically much better only a trace of lysis was observed after three hours at this temperature.

A possible explanation is that the adsorption of the lysin on to red cells at body temperature may vary from time to time, and this would correspond with the clinical fluctuations so typical of this disease. If adsorption takes place readily at 37° C. severe intravascular lysis must inevitably follow (which can be paralleled by keeping whole blood in vitro at 37° C. when lysis readily occurs), with the result that there can be little "free" lysin in the plasma, which in turn probably accounts for the difficulty in demonstrating the lysin by the "washed cells" technique.

This fluctuation in the amount of "free" or unadsorbed lysin is of importance, for serological tests (probably using serum and washed cells) are the most likely to be performed when the patient is clinically at his worst. This is just the time when according to our experience it would be most difficult using this technique to obtain evidence of in-vitro

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autohæmolysis and also the time when the *p*H needs the most careful regulation.

DISCUSSION

Donath and Landsteiner in 1902 demonstrated that cold hæmoglobinuria was associated with the presence of an abnormal lysin in the patient's serum; they showed that in order to obtain autohæmolysis in vitro the blood had first to be cooled and then warmed. These observations have since been confirmed and elaborated, and it is now established that preliminary cooling is essential for the union of lysin (amboceptor) and cells, while the subsequent warming is necessary for the action of complement. Mackenzie (1929b) discusses in his important review the maximum temperature at which union of lysin and cells will take place; this was recorded as 20° C. by both Donath and Landsteiner (see Mackenzie 1929b) and by Grafe (1911); Moro and Norda (1909) observed adsorption at 17° C., but the highest temperature noted by Mackenzie himself (1929a) was 12° C.

The behaviour of our patient's blood is very different. Although there is evidence that the lower the temperature the more readily can adsorption be demonstrated, it will take place to some degree at 37° C.; indeed using whole blood autohæmolysis has been observed whenever the blood was examined at this temperature. Clinically, the process in our patient is clearly independent of cooling, and lysis might reasonably be expected to take place at body temperature in vitro.

The rôle of the hydrogen-ion concentration of the serum or plasma in the demonstration of lysis in vitro is particularly important because neglect in its control may result in the complete failure of lysis. As long ago as 1909 van den Bergh, in a case of cold hæmoglobinuria, found that exposure to carbon dioxide aided the adsorption of lysin by the red cells; cooling to 16° C. in an atmosphere of carbon dioxide produced the same result as the more drastic cooling in air. Hannema and Rytma (1922) and Kumagai and Ito (1916–17) confirmed this observation; the latter workers found that "carbon dioxide hæmolysis" disappeared with adsorption of lysin and believed that carbon dioxide facilitated lysis by allowing it to occur at a higher temperature than usual.

Mackenzie (1925), however, was unable to show that carbon dioxide played any part in this phenomenon. The early experiments of Chvostek (1894), in which the application of a ligature to a finger without associated cooling (which is a usual method of performing Ehrlich's test) produced local hæmoglobinæmia, suggest that the action of carbon dioxide in vitro may be applicable to the patient's blood in vivo. The well-known association of vasomotor disturbances, cyanosis, and similar changes, in patients with cold hæmoglobinuria, adds support to this view, since local cyanosis and retarded circulation are associated with a local increase in carbon-dioxide tension.

From our own results it seems clear that carbon-dioxide tension and hydrogen-ion concentration in particular are of critical importance for the production of hæmolysis both in vitro and in vivo; the nocturnal periodicity of the hæmoglobinuria in our patient may possibly be connected with this. At night the respiratory centre is relatively insensitive, with the result that pulmonary ventilation is reduced and there is some rise in carbon-dioxide tension in the blood, and possibly a slight fall in *p*H (see Kleitman 1929). If we may judge from our in-vitro experiments this would result in a slight increase in lysis, perhaps just sufficient to raise the plasma hæmoglobin above the renal threshold for excretion.

REPORTED CASES

Author.	No. of cases.	Serological findings.
Chauffard and Troisier (1908).	1	No report.
Chauffard and Vincent (1909).	1	Slight autolysis in venous blood.
Marchiafava and Nazari (1911).	3	No report.
Van den Bergh (1911).	1	Patient's cells lysed by own serum at 37° C. in the presence of carbon dioxide; also lysed by normal sera (? group isolysins).
Biffis (1915).	5	(*a*), (*b*), (*d*), and (*e*) D.-L.R. negative with or without the addition of complement or carbon dioxide; (*c*) no lysin for normal or the patient's cells.
Giffin (1923).	1	No report.
Panton, Maitland-Jones, and Riddoch (1924)	2	,,
Scheel (1925).	1	,,
Manini (1927).	3	(*a*) and (*b*) No autolysin demonstrated; (*c*) no report.
Salén (1927).	1	D.-L.R. negative; repeated many times with and without complement.
Enneking (1928).	2	In one of the cases a lysin active at 37° C. was demonstrated.
Barta and Görög (1929).	1	No D.-L. amboceptor demonstrated.
Hitzenberger (1930).	1	D.-L.R. negative.
Bergmark (1931).	1	No report.
Marchiafava (1931).	1	,,
Micheli (1931).	1	D.-L.R. repeatedly negative.
Rosenthal (1932).	1	D.-L.R. repeated five times at 0° C., room temperature, and 37° C., with and without the addition of complement. Always negative.
Weir (1933).	1	A slight D.-L.R. once obtained.
Lolli (1933).	1	No report.
Iglauer and Frenreisz (1934).	1	D.-L.R. negative.
Schally (1934–35).	1	D.-L.R. repeatedly negative. ? Slight autohæmolysis whole blood in vitro.
Falkiewicz and Musial (1935).	1	D.-L.R. repeated twice with and without additional complement. Result negative.
Salén (1935).	1	A thermostable autolysin of unusual type demonstrated.
Trestini (1935).	1	D.-L.R. negative.
Hamburger and Bernstein (1936).	2	(*a*) Auto- and iso-lysins were found in the blood only to disappear when the paroxysms were over; (*b*) D.-L. test repeatedly negative.
Witts (1936).	1	No report.
Cain, Cattan, Harrispe, and van der Boijen (1937).	1	No autolysins found; D.-L.R. negative.
Bodley Scott, Robb-Smith, and Scowen (1938).	2	(*a*) D.-L.R. negative, no autohæmolysis at 37° C.; (*b*) D.-L.R. negative.

D.-L.R. = Donath-Landsteiner reaction.

PREVIOUS REPORTS

In the accompanying Table we have collected the serological findings of the published cases of paroxysmal hæmoglobinuria of the Marchiafava type so far as the literature has been available to us. It is difficult to say whether they all represent the same disease since most of the vital evidence is missing.

The reports of Chauffard and Vincent (1909), van den Bergh (1911), Enneking (1928), and Salén (1935) merit special consideration.

Chauffard and Vincent (1909) noted autolysis of their patient's venous blood after keeping it for a few hours at room temperature; with normal blood this was never observed. They suggested that this was an in-vitro demonstration of the "fragility" of the blood.

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Van den Bergh's (1911) results were substantially the same as ours. With serum and washed cells autohæmolysis was observed at 37° C., but only in an atmosphere of carbon dioxide; it was not noticeable at room temperature (16° C.) or at 37° C. in the absence of carbon dioxide. Using two different normal sera and his patient's cells, with the first serum lysis was observed at 16° C. and 37° C. only in the presence of carbon dioxide, but with the second serum lysis was obtainable at 16° C. and 37° C. with or without carbon dioxide. It is possible that the latter result may have been due to the normal group isolysins. He concluded that carbon dioxide revealed a diminution in the resistance of the patient's cells to hæmolytic substances in the normal serum, or that of the patient himself, but that this unusual red cell fragility was not manifest in dilute solutions of sodium chloride.

Enneking (1928) described two cases of unusual hæmoglobinuria, with detailed serological findings in one of them. Using washed cells and serum obtained at 37° C. autohæmolysis was observed at room temperature and 37° C., but only after the addition of complement; a greater degree of lysis was noted at 37° C. than at room temperature. The patient's cells were not lysed by normal sera, but the patient's serum did lyse normal cells—the usual finding in cold hæmoglobinuria.

Salén (1935) reported a very remarkable case, and some of his results are not easily explained. He demonstrated the presence of an abnormal lysin capable of acting upon normal cells as well as those of the patient. This lysin was of high titre and was not inactivated by heating to 59° C. for 45 minutes, and complement was apparently unnecessary for its action; he claimed to demonstrate its presence in the urine. Auto-agglutination was a prominent feature.

From these three detailed reports it appears that the autohæmolytic mechanism may not necessarily be the same in all, though it produces a similar clinical picture. This is not surprising, for there is no reason to expect abnormalities of essentially "intrinsic" origin to take the same form in different individuals.

Autohæmolysis may be produced by a serum abnormality such as probably existed in Enneking and Salén's cases; on the other hand, the cells themselves may be to blame, as is probable in our patient. It appears that for some reason the red cells in our patient had become sensitised to a potential lysin present in normal and the patient's own serum. Human sera contain many natural heterolysins against "foreign" (i.e., animal) red cells as well as group-specific isolysins, so that this might be quite possible if the red cells had become antigenically suitable. We can, unfortunately, offer no explanation as to how this sensitisation has arisen.

TREATMENT

On purely empirical grounds the treatment finally employed in this patient was removal of the spleen, and it brought apparent benefit. From our observations, however, it might be expected that improvement would follow intensive treatment with alkalis. It may be argued that in a system so highly buffered as blood it would be difficult to alter significantly the hydrogen-ion concentration using non-toxic doses of alkalis. On the other hand, if the slight changes in acid-base balance which occur at night are responsible for the nocturnal increase in hæmolysis, alkali therapy might well do good.

As our patient is now gradually improving without recurrence of her original symptoms we have not been able to try the effect of alkalis under controlled conditions.

SUMMARY

In a case of paroxysmal nocturnal hæmoglobinuria of the Marchiafava type, autohæmolysis has been demonstrated in vitro and shown to be dependent upon the *p*H of the system. The optimum *p*H for lysis is approximately 7·0–7·2, and it could not be produced at a *p*H greater than 7·8.

Autohæmolysis of whole blood will occur at 37° C. without preliminary chilling.

It is suggested that the patient's red cells are sensitive to a potential lysin present in normal sera. The interaction between the patient's red cells and this lysin is probably responsible for the clinical picture of severe hæmolytic anæmia with nocturnal hæmoglobinuria.

This work was done with the aid of grants from the Medical Research Council and during the tenure of a Medical Research Council scholarship by one of us (J. V. D.).

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ROYAL MEDICAL BENEVOLENT FUND.—At a recent meeting of the committee fourteen annuities and fifty-one grants were awarded, twelve to new applicants. The total amount voted was over £1500. The following are particulars of three cases:—

Widow, aged 86, of M.B., who up to the time of his death in 1938 had been in receipt of a fund annuity of £78, an Epsom pension of £62, and an old-age pension of £26, all of which ceased at his death, leaving his widow with only her old-age pension of £26. Voted a fund grant of £52.

Daughter, aged 67, of M.R.C.S., who since her father's death has supported herself by giving lessons in music and languages. She had to give up her employment and enter hospital where a panhysterectomy was performed last October. Her income during the past 12 months had only been £15 from earnings and £15 from occasional gifts. Only through the kindness of friends who gave her clothing and many meals was she able to manage. Fund voted £31 10s. for nursing-home fees and in addition voted £36 for a period of 12 months.

Widow, aged 62, of M.B. Since her husband died in 1918 this lady has supported herself as nurse companion till last December. She is handicapped from getting employment by her age and also by a Dupuytren contraction of her right hand, the operation on which was not successful. Fund voted £26.

Subscriptions and donations are urgently needed and may be sent to the hon. treasurer of the fund, 11, Chandos-street, Cavendish-square, London, W.1.

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RUPTURE OF THE SUPRASPINATUS TENDON

By C. H. Gray, F.R.C.S. Eng.
FRACTURE AND ORTHOPÆDIC REGISTRAR TO THE MIDDLESEX HOSPITAL

Rupture of the supraspinatus tendon was first described in 1834 by J. C. Smith, an English anatomist, who reported a series of post-mortem examinations in which the lesion was found. No further interest was taken in the subject until 1912, when Codman observed his first cases, and began a study of the subject which culminated 22 years later in the publication of his book "The Shoulder," a classic monograph in which all the clinical and pathological abnormalities of the supraspinatus tendon were lucidly described. The incidence of rupture of the supraspinatus tendon in elderly cadavera has been investigated by various anatomists, and their figures vary between 17 per cent. and 40 per cent. Evidently the lesion is not rare. Codman, whose careful and protracted study of the shoulder-joint invests his views on this subject with authority, has stated that it is the most common industrial injury causing prolonged disability. The frequency of the lesion as a clinical entity could be determined only by the systematic investigation of a large series of cases, but its serious import is not in doubt.

This subject has not as yet received much attention in this country, and it is hoped therefore that the few cases here recorded may be worthy of attention.

ANATOMY

Relations of the shoulder-joint.—The subscapularis, supraspinatus, and infraspinatus tendons form a continuous sheet of considerable thickness, which envelops the head of the humerus, lying immediately superficial to the capsule of the shoulder-joint. The subacromial bursa is interposed between the tendinous sheet below and the deltoid, acromioclavicular arch, and coracoid process above (Fig. 1). The tendinous sheet or "cuff," as it is called, separates the bursa from the shoulder-joint proper, and there is normally no communication between them. The communications sometimes encountered in the dissecting-room are the result of rupture of the supraspinatus tendon accompanied, as it usually is, by a tear in the floor of the subacromial bursa.

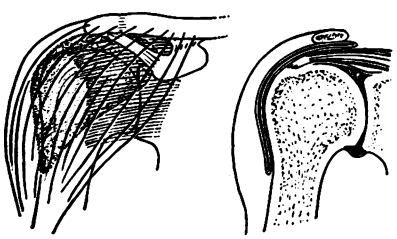

FIG. 1.—Extent and relations of the subacromial bursa (stippled) on the left. The horizontal shading indicates the musculo-tendinous cuff.

Function of the supraspinatus muscle.—For many years it has been stated in anatomical text-books that the supraspinatus is responsible for performing the first few degrees of abduction at the shoulder-joint when bringing the arm away from the side, so that the vertically disposed deltoid may acquire leverage, but actually its rôle is fundamentally important throughout the whole range of abduction. During abduction of the arm by the deltoid, the head of the humerus tends to slip upwards over the glenoid fossa (Fig. 2). The supraspinatus, pulling transversely, holds the articular surfaces firmly together, thus supplying a fulcrum against which the deltoid works. A workman raising a ladder from the ground always has a mate standing with his foot on the bottom rung, so that the end of the ladder will not slip away. The deltoid corresponds to the man raising the ladder, the supraspinatus to the man standing at its foot. In both cases the presence of a fulcrum is essential before adequate leverage can be obtained. Rupture of the supraspinatus tendon might therefore be expected to interfere with abduction of the arm, and this is in fact the case.

Mechanism of elevation.—When the scapula is fixed, the humerus can be passively abducted in the coronal plane through only 90°, and some movement of the scapula over the thoracic wall is therefore necessary in order to accomplish the arc of 180° that is described in bringing the arm from the side of the body into full elevation. The act of elevation in the coronal plane may be analysed into 90° of scapulo-humeral movement, and 90° of scapulo-thoracic movement, but this division is artificial as regards active movements of the normal shoulder-joint; for if a healthy man is observed from behind while he elevates his arms, it will be seen that the two elements of the manœuvre proceed smoothly and simultaneously. It must be remembered that full elevation by abduction is possible only if the humerus is externally rotated. With the humerus internally rotated, abduction cannot be carried beyond the right angle in adults, although in some children almost full elevation is possible. Therefore when testing the range of active or passive abduction it is important to keep the humerus in external rotation. Abduction in this paper means a movement of the humerus from the side of the body in the coronal plane. In practice the coronal and sagittal planes are seldom used, because the shoulder-joint functions more efficiently when the humerus lies in the plane of the scapula—i.e., in a plane drawn at right angles to the glenoid cavity through its vertical diameter.

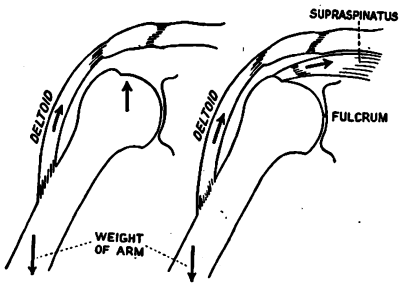

FIG. 2.—Action of the supraspinatus muscle.

PATHOGENESIS

With the joint tissues in a subnormal state either from a toxic disturbance or because of senile degeneration, some trivial muscular effort or a mild contusion of the tendon may be enough to cause the rupture of a few fibres; and in such a case repeated minor injuries may cause more and more fraying until eventually the rupture becomes complete by a process of attrition. On the other hand, a complete rupture may be encountered which has apparently ensued from a single severe injury or violent muscular contraction, the patient being in excellent health. It may seem curious that a healthy tendon should tear across in this way, but the fact remains that ruptures have been known to date from a single and well-remembered accident in healthy individuals who have never before had the slightest trouble with their shoulders; and at operation no evidence of degenerative changes can be found.

Several types of partial rupture may be met with at operation and in post-mortem specimens. A pulpy, œdematous area in the tendon may be found, or there may be fraying of the fibres on the upper or lower surface. In complete tears the proximal portion retracts, leaving a triangular gap bounded at its base by the greater tuberosity, with the distal stub of tendon attached to it, and at the sides by the subscapularis and infraspinatus tendons. The rupture

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occurs very close to the supraspinatus facet on the greater tuberosity, and sometimes extends laterally into the subscapularis and infraspinatus tendons. Further, in complete tears the floor of the bursa is usually also torn, and there is a direct communication between the shoulder-joint and the cavity of the bursa.

A partial rupture in an otherwise healthy tendon may heal without operation, or at least may cease to give rise to any disability, but a complete rupture unless sutured causes serious and permanent impairment of function. In chronic cases of either partial or complete rupture grave changes develop in the adjacent structures. The bursal wall becomes thickened and adhesions develop across its cavity. The greater tuberosity becomes eburnated and rounded off, and the tendinous long head of biceps may become frayed and eventually rupture. There is only a little erosion of articular cartilage and practically no osteophyte formation, although this is the condition in the shoulder which corresponds to osteo-arthritis in other joints.

CLINICAL FEATURES

The lesions are seen most commouly in middle-aged labouring men. Complete and partial ruptures resemble one another—their signs differ in degree rather than kind.

Complete rupture.—A history of injury is sometimes obtainable. The patient may have fallen on to his shoulder, or he may have ruptured the tendon by muscular violence—e.g., while carrying a weighty object in one hand the patient stumbles and suddenly elevates this arm in an effort to maintain his balance. If the rupture occurred by attrition there may be no history of injury. Acute ruptures are followed by severe pain, coming on soon afterwards, due to muscle spasm and to distension of the bursa with synovial fluid and blood. This pain passes off after a few days and the joint then settles down into a condition of chronic disability, presenting the following clinical features :—

(1) The joint is painful after use and often also at night. The patient frequently complains that he cannot sleep on the affected side. In addition, pain referred to the insertion of the deltoid is a curiously constant symptom.

(2) Active abduction is limited, usually to 50° or 60°, and it cannot be maintained against the slightest pressure. This abduction is obtained by scapulo-thoracic movement only; there is no scapulo-humeral movement. It has been stated that in cases of complete rupture there is reversal of the scapulo-humeral rhythm—i.e., that scapulo-thoracic movement is dissociated from scapulo-humeral movement, and precedes it during the upward and downward excursions of the humerus in the coronal plane. This is certainly true after partial rupture (see below), but when the tear is complete, the range of active abduction is so limited that only the first phase of the reversal can be observed.

(3) The deltoid can be felt to contract strongly, and this excludes circumflex palsy from the differential diagnosis.

(4) Passive abduction is possible through a normal, or only slightly decreased, range. Stiffness is not the cause of the disability.

(5) The patient winces as the humerus, during passive abduction, passes the right-angle position —i.e., as the greater tuberosity moves under the acromion process. Once past the right angle the pain disappears, only to return as the arm, when being lowered, reaches the same point.

The wince at 90°, and the weak and limited active abduction, although the deltoid is not paralysed and there are no adhesions to limit movement, are the salient features of the syndrome. On further examination there is wasting in the supraspinatus fossa, and sometimes the gap in the tendon is palpable. There is always a tender spot over the tendon.

Partial rupture.—The clinical features are similar to those of complete rupture but in a lesser degree. There is a wince at 90° during passive abduction of the arm, a tender spot is found over the tendon, and there is some loss of power. Full active elevation of the arm may be possible, but not against any appreciable resistance. In addition, the scapulo-humeral rhythm is disturbed. The scapulo-humeral and scapulo-thoracic movements now take place separately, as follows :—

Going up	0°– 90°	scapulo-thoracic
	90°–180°	scapulo-humeral
Coming down	180°– 90°	scapulo-thoracic
	90°– 0°	scapulo-humeral

The severity of the disability presumably depends on the degree of the rupture, and it is frequently difficult or impossible to distinguish complete from partial ruptures.

TREATMENT

Complete ruptures urgently demand operation. Delay may result in so much retraction and such severe degenerative changes that the tear cannot be sutured. In cases of partial rupture the extent of the tear and its capacity for surgical repair must be assessed from the clinical findings. The following is an account of Codman's operation :—

The patient lies on his back (Fig. 3). A sandbag is placed under the injured shoulder and another under the buttock on the same side, so that the patient's body is turned slightly away from the surgeon,

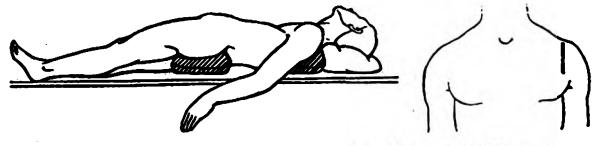

FIG. 3.—Position of the patient on the operating table. Right: The line of the skin incision.

who stands on the side to be operated upon. The sandbag under the shoulder serves to push the head of the humerus forwards and the arm hangs downwards over the side of the table. A straight incision is made vertically downwards in front of the shoulder from the acromioclavicular joint over the greater tuberosity. The deltoid is split in the line of the skin incision, and the roof of the subacromial bursa comes into view. The bursa is then opened and its floor exposed. In cases of complete rupture, the floor will contain an aperture leading directly into the shoulder-joint. This aperture is enlarged and the ruptured tendon examined (Fig. 4). By rotating the humerus the subscapularis and infraspinatus tendons may also be brought into view. After freshening the ends, the retraced proximal portion is drawn down and sutured with No. 10 silk to the stub on the greater tuberosity, or, if this is too small, to the bone itself. The deltoid is sutured with catgut and the wound closed. Living sutures of fascia lata may be used instead of silk to repair the tendon.

The arm is supported on a pillow for four days and then active movements of the shoulder are begun. Strain on the sutured tendon is avoided during the first fortnight by performing all exercises in the stooping position (swinging exercises).

In partial ruptures the floor of the bursa must be incised in order to display the tendons. If there is any perforation it is closed, but if only frayed or œdematous areas are found they should be left alone. If the bursa is inflamed it may justifiably be excised,

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because this frequently relieves the patient of his pain.

CASE 1.—A sailor, aged 60, attended Middlesex Hospital in February, 1937, having injured his left shoulder six months previously, when he fell forwards on to his left hand. Since then had complained of weakness of the shoulder and pain over the greater tuberosity and over the insertion of the deltoid.

On examination.—Active abduction was possible to beyond the right angle, but not against slight resistance. Passive movements were full and accompanied by a wince at 90°. Deltoid acting; wasting in supraspinous fossa. X ray examination negative. Diagnosis: complete rupture of supraspinatus tendon.

Operation (Feb. 25th).—A complete tear was found with wide retraction of the ends, which were friable. Repair was impossible. The greater tuberosity was found to be flattened and the articular cartilage nearby eroded. The walls of the bursa were thickened and its cavity partly obliterated by adhesions. Nothing was done.

Result.—The pain and weakness have persisted.

CASE 2.—A carpenter, aged 66, attended Middlesex Hospital in October, 1937, complaining of pain and weakness of the right shoulder of three weeks' duration. There was no history of injury. The pain was felt principally over the belly of the deltoid.

On examination.—Active abduction to 70°, but he could not maintain this against slight pressure. Passive movements almost full, with a wince at 90°. Deltoid acting. Tenderness in front of greater tuberosity. X ray examination negative. Diagnosis: complete tear of supraspinatus tendon.

Operation (Nov. 2nd).—The walls of the bursa were inflamed, and in its floor was an aperture leading directly into the shoulder-joint. There was a complete tear of the supraspinatus tendon, which did not appear to be degenerate. The tendon was sutured with No. 10 silk. Swinging exercises began after four days, active abduction after two weeks.

Result.—A month later he had regained full active abduction and almost full power.

CASE 3.—A painter, aged 26, attended Middlesex Hospital in September, 1937, complaining of pain and weakness of the left shoulder, dating from a fall six weeks previously. The symptoms and signs were those of a complete rupture. He had been treated with physiotherapy but without relief. In view of his age (supraspinatus rupture is rare in the young) a cautious attitude was adopted, and operation was not advised until twelve weeks had elapsed since the accident. It was refused.

Result.—He has shown no improvement and is quite unable to work, although it is now four months since he fell.

THE SYNDROME ASSOCIATED WITH FRACTURES

The difficulties that arise in the clinical differentiation of complete from partial ruptures have already been mentioned. The problem is rendered still more complex by the not infrequent occurrence of the supraspinatus syndrome during recovery from injuries of the shoulder-joint that have not caused any rupture, partial or complete, of the supraspinatus tendon.

This diagnostic dilemma is met with from time to time in cases of fracture near the shoulder-joint. A series of 57 of these fractures was observed in order to determine the frequency of the syndrome, and if possible to evaluate its significance in these circumstances.

The series included:—

(1) 23 abduction fractures of the surgical neck of the humerus.

(2) 12 avulsion fractures of the greater tuberosity. Of these, 11 were fractures without displacement; displacement was present in the remaining case.

(3) 9 fissured fractures of the greater tuberosity.

(4) 6 adduction fractures of the surgical neck of the humerus.

(5) 6 fissured fractures of the surgical neck of the humerus.

(6) 1 fracture of the coracoid process.

The symptoms and signs of supraspinatus rupture were observed in 8 of these patients. The single case in which there was avulsion with considerable displacement of the supraspinatus facet from the greater tuberosity was one of these. This injury

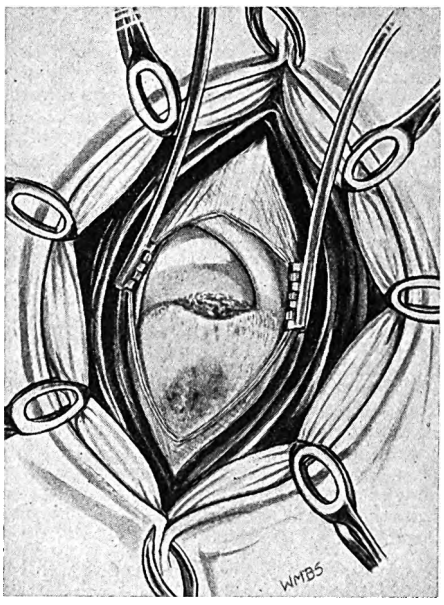

FIG. 4.—A complete rupture exposed by enlarging the hole in the floor of the subacromial bursa, the edges of which are shown drawn aside by the retractor. The crescentic edge of the torn tendon is well shown, and the long head of the biceps appears on the left-hand side.

will be considered first because it is, of course, equivalent to a complete rupture of the supraspinatus tendon. The remaining 7 cases will then be described.

Avulsion of the supraspinatus facet is often associated with an anterior dislocation of the shoulder, and when the dislocation is reduced the separated fragment of bone nearly always falls back into place and stays there. Occasionally the fragment is drawn up under the acromion process and the resulting disability is that of a ruptured supraspinatus tendon. In these cases the bursa preserves its integrity, because it retracts en bloc with the tendon. Manipulative reduction of the small fragment is of course impossible, but usually the fractured surfaces can be brought into apposition by placing the arm on an abduction splint, on which it is kept until the patient can actively raise the arm from the splint. Two or three months will usually have elapsed before this is possible. If this method fails, the fragment of bone should be excised and the tendon sewn back to the greater tuberosity. (To peg or suture the separated facet to the greater tuberosity might appear to be the better course, but in practice this may lead to the formation of a small excrescence of new bone, which grates painfully on the acromion during abduction at the shoulder.)

CASE 4.—A housewife, aged 52, was seen at Middlesex Hospital in July, 1937, with a subcoracoid dislocation of the right shoulder. The supraspinatus facet was avulsed from the greater tuberosity. After reduction of the dislocation X ray examination showed that the supraspinatus facet had been pulled up under the acromion process.

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Operation (two weeks later).—The facet was sutured back into place. Immediately before operation she had the symptoms and signs of a complete rupture of the supraspinatus. Active abduction was possible through only 10°.

Result.—Improvement has been slow. Two months after operation she could actively abduct to 100°, and she is still slowly improving.

CASE 5.—A typist, aged 22, attended Middlesex Hospital in October, 1937, having fallen and injured her right shoulder on the previous day. X ray examination showed a small chip of bone avulsed from the supraspinatus facet on the greater tuberosity.

On examination.—She presented the signs and symptoms of a complete rupture of the supraspinatus tendon. Active abduction was possible only to 30°. The joint was treated by active mobilisation.

Result.—The original disability persisted for one week, when she began a rapid recovery, which was complete after one month.

CASE 6.—A shopkeeper, aged 28, attended Middlesex Hospital in October, 1937, having been knocked down in the street on the same day.

On examination.—The shoulder was very tender and irritable. Movement was almost impossible. X ray examination showed an avulsion fracture of the greater tuberosity without displacement. That night and on the succeeding day he had severe pain which gradually settled down. Active movements of the shoulder-joint, under supervision in the massage department, were prescribed.

Result.—One week later the syndrome of complete rupture was present. It persisted for three weeks, then improvement set in and the shoulder was normal within two months.

CASE 7.—A commercial traveller, aged 51, attended Middlesex Hospital in December, 1936, having fallen in the street that morning and injured his left shoulder. X ray examination showed an abduction fracture of the surgical neck of the left humerus. The fracture was reduced and immobilised with the arm at the side for two weeks; then active movements were begun. After seven weeks, passive movement of the shoulder was possible through an almost normal range, the deltoid contracted strongly, but active abduction to 50° only was present and this position could not be maintained against the slightest pressure. During passive movements there was a wince at 90°. A diagnosis of rupture of the supraspinatus tendon was made.

Operation (Feb. 19th).—The bursa and the supraspinatus tendon appeared to be perfectly normal. Nothing was done.

Result.—Five months later he had made a complete recovery.

CASE 8.—A housewife, aged 37, attended Middlesex Hospital in October, 1937, having fallen and injured her left shoulder. X ray examination showed a fissured fracture of the greater tuberosity. Active movements were begun at once. The signs and symptoms of a ruptured supraspinatus tendon developed and persisted for seven weeks, at the end of which time an operation was performed.

Operation (Dec. 1st).—The walls of the bursa were thickened, its lining soggy and reddened. The supraspinatus tendon was dark red, and when touched with a forceps seemed to be almost friable, in strong contrast to the normal elastic consistency. A film of granulation tissue was creeping over the insertion of the infraspinatus, but apart from this the other tendons were unaffected. Nothing was done.

It is still too early to assess the progress of this case.

CASE 9.—A housewife, aged 64, fell on to her right shoulder in July, 1937, was seen at Middlesex Hospital seven weeks later complaining of persistent pain in the shoulder. She was tender over the supraspinatus tendon. Active and passive movements were full, but during the latter there was a wince at 90°. Active abduction against moderate resistance was impossible. X ray examination showed a fracture of the coracoid process united in good position. It was thought that excision of the subacromial bursa would relieve her pain.

Operation (Oct. 26th).—The bursa showed the changes of chronic inflammation. Its cavity was almost obliterated by adhesions and its walls were adherent to the surrounding structures. The supraspinatus tendon was frayed and degenerate on its upper surface over an area the size of a halfpenny, about half an inch from the greater tuberosity. The tendon was not perforated. The major portion of the bursa was excised.

Result.—Pain relieved.

CASE 10.—A bricklayer, aged 59, attended Middlesex Hospital in July, 1937, having injured his left shoulder in a fall that morning. The shoulder was painful and irritable. X ray examination revealed a minute fissure in the greater tuberosity of the humerus. Active movements were begun at once. He made slow progress, and after eight weeks a manipulation of the shoulder was performed. A full range of movement was easily obtained. One week later a tentative diagnosis of partial rupture of the supraspinatus tendon was made, but he was anxious to return to work. He did so, but had to give it up after four days because of the pain. The shoulder became weaker.

Operation (Oct. 13th).—The bursa showed the changes of subacute inflammation. In its floor there was an aperture leading directly into the shoulder-joint. The supraspinatus tendon was completely torn. The proximal end had retracted under the acromion process. An attempt was made to draw it down, but it was too friable. The bursa was excised.

Result.—His pain has been relieved, but the range of movement has not been improved.

CASE 11.—A manageress, aged 56, attended Middlesex Hospital in January, 1937, with an abduction fracture of the surgical neck of the humerus. The fracture was impacted in good position, and active movements were begun at once. After six weeks she presented the syndrome of a ruptured supraspinatus, and these signs and symptoms persisted. Operation was refused. Six months later she hade made no improvement. The shoulder was painful and active abduction was possible only to 30°, passive abduction to 100°.

Comments.—Cases 5 and 6 after presenting the classical syndrome of complete rupture, with very serious loss of power and movement, recovered so rapidly and perfectly that clearly there could have been no rupture, either partial or complete. In each there was a minimal amount of bony damage near the insertion of the supraspinatus tendon, and possibly the tendon itself had been contused. Evidently, then, the syndrome of complete rupture may appear from reflex inhibition of the supraspinatus muscle due to a contusion of the tendon, or to trivial bony damage near its insertion, with no displacement. The operation notes on the following case, which was not included in the series of fractures, support this view.

CASE 12.—An engineering apprentice, aged 21, attended Middlesex Hospital in April, 1937, having injured his right shoulder in a fall a few days previously.

On examination.—All the signs and symptoms of complete rupture of the supraspinatus tendon were present. X ray examination was negative. Three weeks later his clinical condition was unchanged, and he suffered considerable pain after attempts to use the arm. An exploratory operation was therefore decided upon.

Operation (May 15th).—The lining membrane of the bursa was reddened and slightly thickened. In the supraspinatus tendon, about half an inch from its insertion, there was a dark patch of soft consistency and about half an inch in diameter. It was evidently a bruise. Nothing was done.

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Result.—The shoulder had fully recovered a month later.

The remaining cases may be considered seriatim. Case 7 at the most could only have had a contusion of the tendon, yet it was three months before he started to recover, seven months before he was cured. Case 8 had a severe injury to the tendon, which at operation gave the impression that it would tear across with very slight provocation. Case 9 had a partial rupture that apparently is not going to cause much trouble. The history in Case 10 suggests that he had a partial rupture that eventually became complete. Case 11 had presumably a complete rupture, since she has shown no improvement over a period of six months.

APPLICATION TO TREATMENT

These cases, taken together, raise the following questions:—

(1) How can the cases of simple contusion that are going to recover be distinguished from more serious injuries?

(2) Can anything be done to aid recovery in a severely damaged tendon—e.g., Case 8—and to prevent subsequent rupture?

(3) What are the indications for operation?

If the supraspinatus syndrome had a unique significance much less difficulty would arise. Unfortunately the clinical picture is ambiguous. As we have seen, the same symptoms and signs may be produced by various conditions of the supraspinatus tendon, ranging from the most trivial contusion to complete rupture, and presumably inhibition of the supraspinatus muscle may give rise to the same disability. Apart from direct inspection of the tendon through an operation wound there is no certain method of identifying the pathological basis on which the clinical syndrome rests. Some suggestions for a clinical evaluation of the degree of injury may be helpful.

In middle-aged labouring men, where the syndrome of rupture is present after the acute reaction to the injury has settled down, operation should not be delayed. Nearly all the cases of complete rupture that have been recorded by Codman and others were in patients of this type, and Codman's views on the frequency of the lesion cannot be lightly set aside. In this type of patient, then, the diagnosis of ruptured supraspinatus is a likely one, and operation may be strongly urged.

In younger patients, and especially those employed in sedentary occupations, rupture is unlikely, and a conservative attitude should be adopted, the patient being carefully observed during the first month after the injury. The appearance of signs of commencing recovery during this period—e.g., Cases 5 and 6—will of course point the way to a further period of waiting, while the recovering muscle is assisted by suitable exercises and by electrical stimulation. If, however, there is no improvement whatever—e.g., Case 8—it is probable that serious damage has been done, which not only renders the tendon incapable of work, but exposes it to the risk of subsequent rupture. It seems reasonable then to rest the tendon for a time, and this can be done by placing the shoulder in the best position, with the arm on an abduction splint, for a further period of one month. Persistence of the disability would then call for an exploratory operation. The operation is easy to perform, it is not dangerous, can be done under local anæsthesia, causes very little pain, and requires a stay in hospital of only four days; and in the present state of our knowledge it is the only means in doubtful cases of being sure that a lesion which is capable of repair but in which delay may be costly is not being missed.

SUMMARY

The pathology and treatment of rupture of the supraspinatus tendon is discussed. The syndrome characteristically associated with this lesion is described; its salient feature is limitation of active abduction.

This syndrome is often seen when little or no damage has been done to the tendon, and diagnosis is therefore extremely difficult. Exploratory operation is recommended in cases where the syndrome persists after an adequate period of conservative treatment.

Injuries to the supraspinatus tendon in association with fractures around the shoulder-joint are described.

I wish to express my gratitude to those members of the surgical staff of the Middlesex Hospital who have kindly assisted me in the preparation of this paper and allowed me to report their cases.

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TREATMENT OF CERTAIN JOINT LESIONS BY INJECTION OF LACTIC ACID

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Recurrent Synovitis and Traumatic Arthritis

Joint injuries are responsible for much chronic disability and they have two sequelæ that stand out as peculiarly unresponsive: (1) recurrent synovitis culminating in lax joint, and (2) traumatic arthritis and peri-arthritis. The symptoms of these two classes differ considerably: instability or abnormal mobility is the chief clinical feature of the former, while limitation of movement characterises the latter. This difference, however, may possibly be symptomatic rather than primary; the manner in which a joint reacts to injury depends not only on the nature of the trauma but also on the structural character of the joint itself. Thus recurrent synovitis with resulting laxity is familiar in joints that depend mainly on the integrity of ligaments and muscular structures (shoulder, knee, and ankle); while traumatic arthritis is more commonly seen in those whose stability derives from the strength of their bony articulation (hip and elbow).

In cases of either group there is often a history of inadequate or imperfect treatment of the primary injury, and the patient does not reach the orthopædic surgeon until the condition is well established. In this paper I endeavour to outline a method of treatment that seems to deserve further trial. It is based on observations on the synovial fluid.

CHEMICAL CHANGES IN SYNOVIAL FLUID

Though the serocytological changes in the synovial fluid that follow injury and synovitis have been

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fully described by pathologists, less attention has been directed to physiochemical alterations in the synovia. Stirling's demonstration (1932) that the hydrogen-ion content of the primary hæmatoma around a fracture changes from alkaline to strongly acid opened a fresh field for investigation. It was assumed that this acidification was a physiological mechanism directed to solution of the bone calcium to allow of tissue regeneration; but examination of simple hæmatomas not associated with fracture, and of pus in certain conditions, led me to suggest that the acidity acted as an excitant of polymorphonuclear leucocytosis and later of local mesoblastic proliferation (Waugh 1936). Observations were then made on the *p*H of a large number of joints.

(*a*) *Normal joints.*—It was difficult to obtain accurate information about the *p*H in normal joints, since any joint opened by operation might be assumed to be in some respect pathological. Accordingly I examined the joints of hares and rabbits within a short time of being killed by shooting; and I also had a chance to examine the synovial fluid of the ankle-joint in two cases of amputation for distant injury. In all of these the synovia gave a *p*H of around 7·4—i.e., of the same alkalinity as normal blood. (It is noteworthy that twelve hours after death the joint contents are definitely acid, averaging *p*H 6·6.)

(*b*) *Traumatic effusions.*—Observations on twenty cases of traumatic effusion are shown in Table I.

TABLE I

Joint.	Cases.	Average *p*H at—			
		24 hrs.	48 hrs.	3 days.	7 days.
Knee	9	5·8	6·0	6·8	7·8
Ankle	6	5·6	6·0	6·5	7·8
Elbow	3	5·8	6·0	6·7	7·8
Shoulder ..	2	5·4	5·8	6·2	7·4
Average *p*H for all joints ..	20	5·65	5·95	6·55	7·7

From these it was concluded that synovial excess following injury becomes acid in the same way as does blood in a hæmatoma. This primary acidity is not so great however as in the fracture hæmatoma, and does not persist so long; nor does the secondary alkalinity reach the high degrees found in the later days of a fracture hæmatoma. The acidity is due, in part at least, to the presence of lactic acid; for the synovial fluid responds to both the Hopkins and the Uffelman tests for this acid. The fact that it is dextro-rotatory on polarisation identifies it with sarcolactic acid which occurs as a fatigue product following muscular action (Howell 1919). It seems reasonable to suppose that the acid is derived from local tissue-cell damage and degeneration.

CLINICAL APPLICATION

The above observations lent support to the theory that the development of acidity was a physiological response to trauma, designed to excite local leucocytosis and repair, and I endeavoured to imitate this physiological reaction in the treatment of lesser joint injuries which had failed to benefit from ordinary therapeutic measures. At first I used a solution of lactic acid alone, but as this caused considerable pain a solution of Novocain acidified to *p*H 5 with lactic acid was adopted. This solution was injected within the capsule of the joint, which was then moved to its full range in all directions; the limb was thereafter immobilised in plaster for a fortnight, followed by Elastoplast support till function had been regained. During the period of immobilisation the usual orthopædic exercises for maintaining muscular tone were employed.

TABLE II

SYNOPSIS OF TRAUMATIC CASES TREATED

Joint affected.	Clinical condition.	Cases.	Result.
Knee.	Lax joint.	4	Functional recovery complete.
"	Traumatic (mono-articular) arthritis.	2	Functional recovery complete, with disappearance of crepitation sounds.
Shoulder.	Lax joint with recurrent subluxation.	2	Full functional activity. No recurrence of subluxation since injection.
Elbow.	Arthritis and peri-articular thickening; fibrous ankylosis.	3	Full functional activity: 85 per cent. of normal range of movement.

NATURE OF CASES TREATED

Table II summarises eleven cases treated in 1936, all of which recovered full functional use of the damaged joint and resumed their normal activities. At first, cases of weak joint following sprain, with laxity of ligaments, recurrent synovitis, and insecurity of function, were treated; among athletes and footballers these conditions are extremely crippling, and in various trades such as coal-mining they cause much economic disability. Later, cases of traumatic arthritis were included with equally satisfactory results; in them the injection was made around as well as into the capsule. The amount of solution used was 2 c.cm. for elbow- and ankle-joint cases, and 4 c.cm. for knee- and shoulder-joint cases; only the cases treated in the year 1936 are included (though I have since treated many others), and the column headed "result" presents the condition as revealed at examination twelve months or more after injection.

In connexion with the treatment two points should be emphasised: (1) The cases treated were those of severe disablement which had resisted various forms of treatment, and until further biochemical and pathological investigation has been made the method should be reserved for such cases. (2) In making the injection the same meticulous adherence to the principles of aseptic technique must be exercised as obtains for the operation of arthrotomy. For this reason, and because immobilisation and orthopædic exercises are essential in after-treatment and part of the technique, all the cases have been treated in hospital and mainly as in-patients.

Two cases of the series may be detailed:—

1. P. J.—Apprentice plater. Strained his knee in February, 1935. Three recurrences of synovitis, last on Oct. 31st, 1935. Diagnosis (Nov. 2nd, 1935): recurrent internal lateral ligament strain. Synovial fluid on same day, *p*H 6·8; on Nov. 15th, = *p*H 7·8; injection on Nov. 15th. On Feb. 2nd, 1936, walking normally; review on Dec. 23rd, 1936: condition of joint normal, had played cricket and football in 1936 as well as performing his ship-yard work; no recurrence of synovitis.

2. F. J.—Coal-hewer. On Jan 19th, 1936, had a severe blow on the head of the tibia, with the knee bent; six weeks in hospital; seen on April 4th. Complaint of knee wobbling and giving way on walking downhill. Synovial effusion; undue lateral and antero-

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posterior mobility. Diagnosis: stretched posterior crucial ligament with laxity of all joint structures. Synovial fluid on April 6th, *p*H 7·8. Lactic acid injection to joint; plaster splint for six weeks, followed by elastoplast bandage for eight weeks. Review on July 16th, 1937: no synovial effusion; walks and runs without much difficulty. He began light work on Nov. 15th, 1936, and resumed full work in February, 1937, hewing coal in 4 ft. seam; "no difficulty."

This was perhaps the most gratifying result in the series, for it had seemed likely that the man would be permanently incapacitated from following his employment. No doubt the long period of rest and graduated exercise was an important factor in the recovery; but in this connexion one may speculate as to whether the trauma attendant on manipulation of joints by orthopædic surgeons and by osteopaths in similar cases may not provoke a local acidification of the joint content and the reaction of repair.

Non-traumatic Hypertrophic Arthritis

This apparent success in the treatment of traumatic arthritis led me to try the method in cases of polyarticular (rheumatoid) arthritis where the disease was no longer active but had left deformity and dysfunction. It was first desirable to determine the *p*H of the synovial fluid in acute rheumatic synovitis, as well as in chronic rheumatoid arthritis. Five cases of acute synovitis of bacterial origin were aspirated daily from the second to the seventh day of the disease; up to the fifth day these returned a faintly acid reaction, averaging *p*H 6·6; by the seventh day the effusion, if present, was definitely alkaline. In the rheumatoid cases absence of free synovial fluid in appreciable amount made exact estimation impossible; some information was, however, obtained by injecting distilled water (*p*H 7 = neutral) into the joint and recovering it by aspiration. In ten cases the dilute synovial return gave the surprisingly alkaline reading of *p*H 8 and over; and the actual *p*H of the joint content must therefore be considerably higher. This may be an important factor in the pathology of the joint changes in this disease.

Only five cases in this second series have been treated. All have derived much benefit, but the result in one is so gratifying that I am tempted to relate it more fully.

Attending the massage clinic was a woman of 29 who had had rheumatoid arthritis for seven years, being condemned to a bath-chair existence for the last three of them. The usual methods of treatment had been employed by the physicians with enough success to make it probable that the disease process was no longer active. This patient had observed the improvement in traumatic cases under treatment in the department, and begged me to try it on her hip-joints. The state of these joints seemed permanently hopeless. The right hip was ankylosed at an angle of 110° with passive movement through 5° only. The left hip had a range of about 15°. There was no evidence of osteo-arthritis but there was much peri-articular thickening; the knees had little diminution of range of movement, but constant crepitation, palpable and audible, was present in both; all the small joints were extensively affected.

In January, 1936, 15 c.cm. of lactic acid was injected into and around each hip-joint, all adhesions were broken down, and full range of movement was obtained. After three weeks' rest in bed, massage and exercises were instituted, and with great perseverance the whole activity of the limbs at the hip-joints was regained. By June, 1936, she was able to walk upright and continued to do so for over a year. In September, 1937, she asked if the knees could be treated; accordingly on Sept. 28th one knee, the right, was treated and the patient instructed to continue movements but refrain from weight-bearing on the limb for eight weeks. Examination on Jan. 3rd, 1938, showed full range of movement at the hip-joints, without crepitation or pain. The right knee had a complete range of movement; the thickening had much diminished, and there were no crepitation sounds. The left knee had not been treated and was unchanged. She is walking well, without pain in the right knee, though the limb is still weak from poor muscular development. The rheumatoid condition in the untreated left knee is unaltered and serves as a useful criterion of the improvement effected. I propose to treat it shortly.

In the other four cases the disease has been treated in the knee-joint. Three of these patients have regained use of the joint; in the fourth the treatment has been interrupted and the deformity is tending to recur. The number of cases in this series is too small to allow of conclusions as to the value of lactic acid injections in treating arthritic deformity. The effects of rheumatoid arthritis are so baffling however that I report my initial successes in the hope that surgeons with more opportunity of treating such cases may investigate the possibilities of this form of therapy.

Summary

1. Normal synovial secretion has the same hydrogen-ion content as blood.

2. Effusions into joints show acidity for three days, changing to alkalinity by the seventh day.

3. Injection of a solution of lactic acid with novocain restored functional activity in cases of traumatic arthritis.

4. The synovial fluid in rheumatoid arthritis shows abnormal alkalinity.

5. In this disease the possibility of restoring function by acid injection deserves further investigation.

6. At present this method should be reserved for cases showing severe disorganisation of joints.

NOTE ON SOLUTION EMPLOYED

The formula to produce an acidity of *p*H 5 is given by Messrs. Bayer as follows:—

Novocain—HCl	2·0 g.
NaCl..	0·5 g.
N/5 lactic acid	0·2 c.cm.
Water to	100 c.cm.

There is so much variability in *p*H value in the various commercial procain preparations that it is advisable to use novocain, which is constant in reaction. For the estimation of *p*H I have employed the Capillator outfit manufactured by British Drug Houses Ltd.; this excellent colorimetric outfit has greatly lessened the difficulty of carrying out such examinations and can be confidently recommended to those who have not a biochemical laboratory available.

Acknowledgments are due to Dr. J. F. Halliday, radiologist, and Miss Turner, masseuse, of the Monkwearmouth Hospital, Sunderland, for continuous assistance in treating the cases; and to Mr. C. Gordon Irwin of the Royal Victoria Infirmary, Newcastle, for giving facilities for demonstrating some of the cases at a recent meeting of the Newcastle and Northern Counties Medical Society.

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AN INVESTIGATION OF A CASE OF TYPHUS FEVER

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THE present case of typhus fever is remarkable for having been acquired in England, and not from direct contact with a patient.

CASE REPORT

History.—A man of 48, employed in a sack warehouse, had been healthy except for dysentery in the war, at which period he had been inoculated frequently, presumably with anti-typhoid vaccine.

On Nov. 8th, 1937, he went to work feeling well but at midday was shivering, his limbs ached, and he vomited. He managed to get home at 5 P.M. but then "lost the use of his limbs and collapsed." On the following days he felt very ill, with an intermittent headache and constipation.

On Nov. 14th, the 7th day of his illness, he was admitted to Ham Green Hospital, Bristol, as a case of suspected typhoid fever. He seemed excited and felt very bad but had no definite symptoms. His temperature was 102° F., pulse 114, and respirations 26. His tongue was very dry and covered with brown fur, his conjunctivæ were injected, and there was slight basal congestion. His pupils were normal; there was no enlargement of the spleen or distension of the abdomen; and the reflexes were normal. No odour from the skin could be detected then or later. Scattered over his trunk was a sparse eruption of discrete rose spots, which could be obliterated on pressure and were rather larger than those of paratyphoid B. Next day the eruption was much more profuse and appeared on the thighs and upper arms, and for the next three days spots came out in crops, leaving some mottling when they faded. On Nov. 15th numerous petechiæ appeared, mostly on the back but also on the thighs and arms, and he was extremely tender on pressure in his calves. There was no tenderness of the bones and no pain in the legs unless the muscles were handled. The tenderness began to go off gradually next day and the rash slowly faded after Nov. 18th, the 11th day of illness. His temperature fell by a rapid lysis on the 12th and 13th days, but oscillated slightly until the end of the 3rd week. There were considerable morning remissions, such as are seen in mild cases of typhus, and temporary falls followed injections of S.U.P. on Nov. 14th and 17th. Once his temperature had fallen his tongue cleared, his appetite returned, and he improved rapidly.

The rash suggested cerebro-spinal fever but there was no evidence of meningeal involvement, and the marked neuritis in his legs led us to consider typhus on the day after admission, and to make agglutination tests on his serum.

BACTERIOLOGICAL FINDINGS

Samples of blood were taken on the 7th, 10th, 12th, and 25th days of illness.

Blood culture.—Felix's (1933a and b) technique for the isolation of proteus was used. Portions of coagulum were kept in the dark at 37° C. and at room temperature, and subinoculations were made on to rabbit blood agar at intervals of two days. Eventually veal broth was added and repeated subcultures made, but all cultures remained sterile.

Weil-Felix test.—Suspensions were used of (*a*) killed organisms from the Standards Laboratory, Oxford, and (*b*) living organisms from the Lister Institute, grown on dried agar at 37° C. for 24 hours and suspended in normal saline. The cultures used were carefully examined for spreading H colonies as these would have reduced the sensitivity of the O antigen. Controls in 3·4 per cent. and 6·8 per cent. saline were used to ensure the absence of smooth→rough variation. The tubes were kept in a water-bath at 52° C. for 24 hours and examined after standing for 15 minutes at room temperature. The highest dilutions of serum which produced complete agglutination, except where specially mentioned, are given in Table I.

TABLE I

Strain of proteus.	Source.	Titres.			
		Sample I	II	III	IV
(O)X19 ..	Standards Laby.	25* & 50*	125	1250	1250
(O)X19 ..	Lister Inst.	25* & 50*	125	1250	1250
(O)X2 ..	Standards Laby.	25*	25*	50	125
(O)X2 ..	Lister Inst.	25*	25*	50	125
(O)XK ..	Lister Inst.	25	25	25	50

* Incomplete.

The titres obtained were, of course, diagnostic of typhus, though titres of 125 for proteus (O)X19 and (O)XK have been recorded by Gray (1937) in a case of gastro-enteritis associated with *Proteus vulgaris* (H). A titre of 200 is strong presumptive evidence of typhus in a patient who has not recently had the disease (Topley and Wilson 1936).

Widal test.—The results shown in Table II were obtained with Standards Laboratory suspensions, and were obviously due to previous T.A.B. inoculation, the slow increase in the titres for the H antigen being presumably a non-specific effect.

TABLE II

	Sample I	II	III	IV
Bact. typhosum (H) ..	125	125	250	250
Bact. paratyphosum A ..	50	50	125	250
Bact. paratyphosum B ..	50	125	250	250
Bact. typhosum (O) ..	Nil	Nil	Nil	Nil

In dilutions of 1 in 25 to 1 in 250 no sample agglutinated the Standards Laboratory suspensions of *Brucella abortus*.

Wassermann test.—The first two sera gave a weak positive, the third a strong positive, and the fourth a negative reaction. This was in keeping with the results of Bauer (1921), and Davidson and Cruickshank (1927).

Urine.—Samples obtained on Nov. 18th and 24th were cultivated by Felix's technique but proteus was not obtained.

Fæces.—Samples taken on Nov. 15th and 25th yielded no pathogenic organisms.

DISCUSSION

The evidence points to infection having occurred at the patient's place of work, a large flour and oil-cake mill, for his home was clean, no vermin were found on him or his contacts, he had had no unusual visitors, and none of his family had been abroad recently or had any illness suggestive of typhus. Examination of the men with whom he worked in sorting sacks and of their homes failed to reveal any vermin or suspicious illness. Two men had been off work, at the beginning of 1937 with "influenza" but their illnesses were not suggestive of typhus and their sera diluted 1 in 25 failed to agglutinate suspensions of proteus (O)X19, (O)X2, or (O)XK. The chances of infection being imported from abroad must be remote as cargoes are constantly reaching

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the mill from typhus-infected countries and yet the last case in Bristol occurred ten years ago and was unconnected with the mill. All ships from infected ports are medically inspected on arrival, and there had been no sickness while in port; nor had the patient been on any of these ships or in contact with their crews.

Infection might have been carried by sacks or other cargo. During the 21 days before the patient fell ill he had handled sacks from Alexandria, Sudan, Rangoon, River Plate, and the Dutch East Indies. On Oct. 21st, 18 days before the onset of his disease, he had been working with the cargo of a ship from Alexandria. If infection came from this it must have survived for at least ten days—the shortest time from Alexandria to Avonmouth—but the actual vehicle of infection is obscure. As the virus of typhus is very susceptible to heat, drying, and chemical agents (da Rocha-Lima 1919), direct inoculation from infected sacks into the abraded skin of a person working with them is extremely unlikely.

The most favourable conditions for the survival of the virus are in the louse, but the sacks showed no vermin of any kind and the men working with them say that it is unusual to find any. A louse may, by ingesting the blood of a typhus patient, become infective (Wolbach and others 1922), and remain so for at least two months (Syssine 1924) and may pass the infection on to succeeding generations in its eggs (Sergent, Foley, and Vialette 1914). Infection by a louse is, then, a possibility here.

Rats are liable to infection with a murine typhus virus and may infect man via their fleas (Zinsser 1935, Topley and Wilson 1936), and we considered the possibility of a rat being imported from a country where typhus is endemic, or of a latent infection in rats remaining over from the epidemics of last century. No rats were caught in traps set in the sorting shed, but some caught immediately outside were investigated for the presence of serum agglutinins for proteus, for Rickettsial bodies in their capillaries and internal organs, and by guinea-pig injection. The serum of one rat gave a titre of 50 for proteus (O)X19, but otherwise the results were negative.

The serological data showed clearly that this case belonged to the type of typhus classed by Felix as "Type X19." This limited the diagnosis to seven of the many typhus fevers known, and, unless a rat was responsible for the infection, geographical considerations narrowed it down still further to three: the classical typhus of the old and new worlds; tropical typhus, type W (shop typhus) of Malaya and the Dutch East Indies; and the São Paulo endemic typhus of Brazil. Male guinea-pigs were inoculated intraperitoneally with citrated blood taken from the patient during his pyrexial period (Nov. 20th) to determine whether they would show, in addition to the usual pyrexia, the scrotal reactions typical of shop typhus and São Paulo typhus as distinct from the classical typhus of the old and new worlds. Only one guinea-pig, however, showed a transient temperature of 103·8° F. 18 days after its inoculation, and the virulence of the virus may not have been sufficient to produce the typical febrile reaction of 105° F.

SUMMARY

The clinical course and bacteriological investigation are described of a case of typhus fever in Bristol which appeared to have been acquired from imported sacks with which the patient worked.

Transmission may have occurred through infected lice or rats, but exhaustive attempts to trace the source of infection were unsuccessful.

We desire to thank the medical officer of health, Prof. R. H. Parry, for permission to publish the case.

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DIPHTHERIA IMMUNISATION WITH FINELY ATOMISED FORMOL TOXOID

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AN attempt to stimulate the production of diphtheria antitoxin in the human subject by inhalation methods was suggested by the interesting and comprehensive work of Claus Jensen (1937). He had shown that intranasal application of diphtheria toxoid provided an efficient secondary stimulus in diphtheria prophylaxis. There were objections to his procedure in dealing with small children which have been discussed elsewhere (Bousfield 1938), and need not be enlarged upon here. Suffice it to say that many small children are frightened by being laid down upon a couch and kept still while nasal drops are inserted and retained for several minutes.

THE EXPERIMENT

Since the nasal stimulus had been proved to be efficient, it only appeared to be necessary to find some way of applying diphtheria toxoid to the mucosa which would not alarm small children. Many possible methods were considered, but finally it was decided to fill the air of a room with finely atomised diphtheria formol toxoid and to submit a number of volunteers to the process of inhaling the air by nose and mouth. It was thought that, owing to the large amount of mucosa and tissue with which the spray must thus come into contact, an efficient immunising stimulus was likely to be applied.

Five adults, besides ourselves, volunteered to undergo the test. All had blood taken for antitoxin titration before exposure to the first toxoid spray. They then entered a room of about 15 by 12 by 10 ft., in which an apparatus capable of atomising toxoid at the rate of about 1 c.cm. per minute was installed. The spray was started and 50 c.cm. of toxoid of about 40 Lf per c.cm. was sprayed into the air. The subjects constantly changed their positions in rotation to allow for possible uneven distribution of the toxoid mist in the air. During the 50 minutes' exposure, all did their utmost to make the experiment successful by free breathing, both through nose and mouth. After a lapse of 14 days six of the volunteers submitted to the same procedure, the seventh being excluded for reasons which will be given later. After a further interval of a fortnight blood samples were again taken from all seven persons in order that the antitoxin content might be compared with the figures obtained before treatment.

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RESULTS

From the immunological aspect the results exceeded expectations in most cases, and if the description could end at this point it might be said that a useful new procedure had been discovered. Unfortunately there was a sequel, but before discussing subsequent events the bare results of the test as regards antitoxin production are given in the Table.

EFFECT OF INHALATION

Subject.	Blood antitoxin titre (units).	
	Before spray.	14 days after two sprayings at 14 days' interval.
1	1/10 unit.	2 units.
2	1/250 "	5 "
3	1/10 "	10 "
4	1/10 "	10 "
5	1/25 "	1/5 unit.
6	1/1000 "	1/500 "
7	1/2* "	2 units.

* One spray only.

From this it will be noted that all those subjects who originally had 1/10 unit of blood antitoxin or more showed a great improvement as a result of the spray treatment. Of the three subjects who had relatively smaller amounts 1/25 unit or less initially, only one showed much antitoxin gain, but the improvement was from 1/250 unit to 5 units, a truly remarkable result.

SYMPTOMS

The actual figures having been given, it may now be advisable to explain a little more about the experiment. If the method were to be applicable to children it was first of all essential to demonstrate that it was quite harmless to adults. On the face of it, there appeared to be very little risk in undergoing the experience, as any amount of toxoid actually taken into the body was likely to be only a fraction of the ordinary injection dose. Nevertheless, the group of adult volunteers was considered much more likely to experience reaction than children, as most adults are far more intolerant to injections of diphtheria toxoid in any form than are children. It was rather expected that the warning note of any allergic phenomena might be observed in the conjunctivæ, and during the first spray experiment a careful watch was kept on this point, but nothing was noted. Three of the volunteers remarked on the presence of slight frontal headache during actual exposure, and one of us experienced a transient pain at the back of the eyes for about three minutes. Nothing was experienced serious enough to deter any of the subjects from volunteering for the second exposure when they separated on the day of the first.

It will be noted in the Table that volunteer No. 7 is shown as having only received one treatment. The reason was this. On the evening of the spraying, which was concluded at about noon, she experienced a tightness of the chest, pains in the back and spine, and had some difficulty in breathing on the following day or two. Her father had a history of asthma, and it was supposed that she might equally be a potential asthmatic. It was therefore considered wise to exclude her from any further participation in the experiment, apart from a final titration of her blood antitoxin at the same time as the other bloods were taken. Incidentally she was one of the subjects who had experienced the frontal headache at the first spraying.

The remaining six volunteers passed through their second spraying without untoward effects, even the headaches being entirely absent. At this point the satisfactory side of the experiment ends. It will perhaps be best to give the history of the subjects as regards previous experience of diphtheria, if any, together with a description of the symptoms experienced by them some hours after the second spraying.

No. 1.—Male aged 44. Had diphtheria about 34 years ago and was treated with a small dose of antitoxin fairly early in the disease. Schick reaction in recent years pseudo and negative. Original blood antitoxin 1/10 unit. About four hours after spraying he felt cold and shivery, but did not take his temperature as connexion with the experiment was not thought of. A tightness of the chest and unsatisfactory cough developed fairly suddenly, and severe malaise was experienced, with the result that he retired to bed at 9 P.M. without his nightly whisky and soda. The taste of alcohol was repulsive. He felt poorly the next morning, but became normal about lunch time. His blood antitoxin was subsequently found to have increased to 2 units. Apart from his knowledge of what happened to the other volunteers he would have regarded the whole as an unusual type of cold.

No. 2.—Female aged 38. Schick-tested and found Schick-positive in 1935. She received one injection of 1 c.cm. of toxoid-antitoxin floccules at that time, but had such a severe local reaction that further treatment was not given. Her blood-antitoxin titre before the spray was 1/250 unit. At the first spraying she was one of the subjects who experienced the frontal headache, and since confessed to slight tightness of the chest during the treatment, but felt respiration very easy immediately afterwards. About 5½ hours after the second spray she began to shiver violently, and her temperature was taken at 8 P.M., when it was found to be 101·4° F. She was sure that it had been considerably higher on her journey home. Her main symptoms were violent frontal headache and pain in the right armpit. Her face was described as having been puffy the next day, which she was obliged to spend in bed At the final bleeding her antitoxin was found to be no less than 5 units. In view of the briskness of her reaction it was thought advisable to perform a subsequent Schick test to see if she had become a pseudo-negative reactor. She was of course negative, but there was no trace of pseudo reaction, an important point in the subsequent consideration of the significance of these signs.

No. 3.—Male aged 44. Negative and faint pseudo reactor to Schick test. His immunity was natural, there being no history of diphtheria. His original blood antitoxin figure was 1/10 unit. About 7 hours after the second spraying he felt faint, became unconscious during dinner, and vomited on becoming conscious. Brandy which was administered to him on regaining consciousness was distasteful to him, though ordinarily he has no such aversion. He was taken home and put to bed and the next day complained of severe pain and stiffness in the knee-joints, but without swelling or effusion. He did not feel normal for several days. He was not one of the subjects who experienced any headache at the first spraying. Actually he is a fairly protein sensitive subject, as he experienced a similar fainting attack following an injection of typhoid-paratyphoid prophylactic vaccine several years ago. His blood antitoxin was found to have increased by no less than 100 times to the figure of 10 units as a result of the spray.

No. 4.—Male aged 17. Never Schick-tested. No history of diphtheria in himself or his family. His initial blood-antitoxin titration showed him to be a naturally immune subject as he had 1/10 unit. On the evening of the second spraying he felt ill and shivered. He went to bed and vomited that night

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and again the next morning. He experienced loss of appetite, and felt sufficiently ill to remain in bed for two days. He had a slight cold on the day of the second spray, which may have complicated the picture as regards the length of his disability. He again showed a big increase in his blood antitoxin as a result of the spray, the figure rising to 10 units, or a hundredfold. He experienced headache at the first exposure.

No. 5.—Male aged 26. Originally a Schick-positive reactor immunised by means of three injections of toxoid-antitoxin mixture about nine years ago. His final Schick test was a plain negative without pseudo reaction. He has no history of contact with diphtheria. His blood antitoxin before the experiment was found to be 1/25 unit. He experienced no discomfort at or after either exposure to the spray, and the final figure obtained for his blood antitoxin was only 1/5 unit. This is a point which may be noted as the increase was only fivefold.

No. 6.—Male aged 20. Was found to be Schick-positive two months previously without any pseudo reaction. He received three injections of toxoid-antitoxin floccules, but the date of his re-Schick test had not arrived at the time of the commencement of the spraying procedure. It is interesting to note that in spite of this treatment two months before, his blood antitoxin immediately before the experiment was only 1/1000 unit. He experienced no ill effects at or after either spray exposure, and when his blood was finally titrated for antitoxin the figure obtained was only 1/500 unit. This case is of particular interest since it is clearly an example of the type of individual who is difficult to immunise, even after multiple stimuli.

No. 7.—Female aged 40. She gives a negative Schick test with a violent pseudo reaction. She has no personal history of diphtheria, but her brother had a bad attack when she was six years old. Her antitoxin content before the first spraying was ½ unit. As previously mentioned she had something that resembled an attack of asthma following the first exposure and was excluded from further treatment. Her blood taken subsequently, at the same time as the others, had increased its antitoxin content to 2 units, a fourfold increase *as a result of one exposure*. As the blood sample was taken one month after her single treatment, not fourteen days after the final spray as in the other cases, her antitoxin might even have been higher at an earlier date. The italics are inserted to stress the fact of the single exposure in this case, as the results are otherwise difficult to understand.

DISCUSSION

It is clear that it is not necessary for a subject to show a pseudo reaction in order to experience an allergic manifestation, as the case of No. 2 shows. At first sight it appears almost as if those who had an original high blood antitoxin content were most prone to allergic symptoms on treatment, but subject No. 2 again throws doubt on that view. Further, age alone is not the determining factor, since No. 4, who had a sharp reaction, was the youngest in the group. The next two youngest escaped allergic manifestations.

Excluding No. 7, which had only one exposure, there is one fact that appears clear. All who were sprayed *twice* and at the same time *produced the largest amounts of antitoxin* were the same subjects who suffered from the allergic symptoms. Subject No. 1 produced the least relative and absolute rise in his blood antitoxin of all those who experienced symptoms, and his reaction was undoubtedly the mildest. The remaining Nos. 2, 3, and 4 showed a much greater production of antitoxin, both relatively and absolutely, and appeared to suffer from allergic symptoms in proportion to that production.

Following on the above observations, the suggestion is put for consideration that the reactions in this experiment may, in part, be connected with the sudden production of considerable amounts of antitoxin. Such overstimulation of the antibody-production-mechanism as there may have been in this experiment might well produce a temporary abnormal state in the body accompanied by a general reaction. It is known that in some subjects antitoxin is produced very rapidly in response to injections and other stimuli. How rapidly such production may have occurred in response to the very wide area stimulated in this test must be a matter for speculation, but the change may have been very rapid.

The question now is, what went wrong with the experiment? The group of volunteers selected for the investigation would have been a particularly susceptible one, and most of its members could be expected to react unfavourably to any *injection* of diphtheria toxoid. If that had been the whole of the difficulty, however, surely the symptoms would have been equally likely to have arisen as a result of the first exposure to toxoid spray. It seems probable that Nos. 1–4 became sensitised at the first spraying and only developed the allergic response as a result of the second treatment. No. 7 was presumably sensitised to some extent before exposure to the first spray.

The possibility is that the experiment may have been thoroughly overdone. A more gentle procedure might have been better. It might have been well to atomise only 10 c.cm. of toxoid and to make the exposure ten minutes instead of fifty. It did not seem likely, when making original approximate calculations, that 50 c.cm. of toxoid atomised in 1800 cubic feet of air could have produced excessive dosage. There must have been much wastage by settlement of the toxoid mist. The fear was rather that the dosage might not be adequate. What was overlooked was the possible effect of the application of minute amounts of toxoid to a very large area of mucosa, in relation to the production of a state of sensitivity. From the immunological aspect the large area involved had been regarded as one of the most hopeful aspects of the prospected method.

Children might stand a modification of the treatment quite well. Smaller dosage and shorter exposure would be indicated, but it would be necessary for an adult to be in attendance. He would be liable to become sensitised unless he could control the procedure through an observation window. Alternatively he might wear a respirator, but such an article would not be calculated to inspire confidence in parents who brought their children for treatment.

Again, the fault may have been with the antigen. Formol toxoid may not have been the ideal preparation for the purpose. Perhaps a more protein-free antigen might be evolved, which would render allergic phenomena far less likely. Symptoms might also be minimised by using a much more dilute formol toxoid in the atomiser.

Since both of us are sensitised, it is difficult to know how to proceed with this investigation. The method seems too hopeful to be discarded finally because this initial effort has miscarried somewhat. If someone fresh and unsensitised could continue the experimental work, and were prepared to proceed much more carefully, using a highly refined toxoid in smaller dosage, the result might well be satisfactory from every point of view.

In spite of Jensen's conclusion that nasal installations were useful only as a secondary stimulus, it is conceivable that stimuli applied to the whole

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respiratory tract might even be effective as a *primary* stimulus, to the exclusion of all injections. The use of some antigen in the atomiser which had the delayed absorption properties of alum-precipitated toxoid might well produce a good initial stimulus in the respiratory tract. A.P.T. as at present constituted would probably be too irritant for practical purposes, but some other form of bound antigen might be produced. In the experiment here described it is probable that some of the atomised toxoid may actually have reached the lung tissue. The very existence of anthracosis shows that finely divided matter can pass the ciliated epithelium of the respiratory tract. Consideration of the above suggests that the method might be applicable to immunisation against other diseases, particularly when antigens with a low protein content, and devoid of irritants, have been evolved. The dosage would have to be determined by careful approach. There is even possibly a future for antigens inhaled as dust in a very finely divided condition.

We desire to extend our thanks to Dr. R. A. O'Brien and Mr. A. T. Glenny of the Wellcome Physiological Research Laboratories for much valuable help in the performance of antitoxin titrations. Also to Milton Proprietary Ltd. for the loan of a very efficient atomiser, without which the experiment could not have been conducted satisfactorily.

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CALCIUM MANDELATE

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THE efficacy of mandelic acid as a urinary antiseptic has been widely recognised since its introduction in 1935. The original treatment with sodium mandelate met with two main objections—the unpleasant flavour of the drug, which tended to cause nausea, and the necessity for the simultaneous administration of an acidifying drug such as ammonium chloride. The latter disadvantage was overcome by the use of ammonium mandelate which is itself a powerful urinary acidifier; but this too is unpleasant to take and often gives rise to nausea.

Schnöhr last year reported upon the clinical use of calcium mandelate and he showed that, like calcium chloride, it is able to acidify the urine. He published a short series of cases treated with the new salt, with satisfactory results. The use of calcium mandelate has also been independently advocated by Hryntschak (1937). Since this salt is almost tasteless, this new method of administering mandelic acid appeared to mark an advance on previous methods and we have been able to confirm the claims made on its behalf.

Pure calcium mandelate is an insoluble, tasteless, white powder. It is immiscible with water, but can be given either mixed with food or milk, or taken as a powder and washed down with water. Schnöhr used a granular chocolate-flavoured preparation. Some of our cases have been treated with pure calcium mandelate which had actually been prepared for one of us (M. L. R.) by British Drug Houses in 1936, but the majority have been given a preparation made by the same firm and marketed under the name of Mandecal. This powder is freely miscible with water and is pleasantly flavoured.

MODE OF ACTION

It has long been recognised that the oral administration of calcium chloride will render the urine acid and this salt has been used in the treatment of urinary infections. The calcium becomes immobilised in the intestine and is not absorbed. Haldane, Hill, and Luck (1923) were able to show that when calcium chloride is taken by mouth most of the calcium is excreted in the fæces as calcium carbonate, while almost all the chloride is absorbed. They postulated that, in the neutral intestinal contents, the calcium was precipitated by the carbonates of the digestive juices, replacing the sodium bicarbonate by sodium chloride. The reabsorbed base (Na) is therefore in combination with a fixed acid radicle (Cl) rather than with the labile HCO_3, the alkali reserve is reduced, and the various regulating mechanisms are set in motion with the resultant excretion of an acid urine. Gamble, Ross, and Tisdall (1923) found that 60 per cent. of the calcium taken by mouth in the form of calcium chloride was excreted in the stools, whilst only 4 per cent. of the added chloride escaped absorption. They further showed that the metabolism of the extra acid ions from the calcium chloride did not disturb the concentration of total base in the blood-serum, though the bicarbonate was lowered by 24 per cent. The mode of action of calcium mandelate is presumably similar, but the mandelic ion, being a non-threshold substance, foreign to the body, is not retained but is rapidly excreted from the body, so that the resultant urine, besides having a low *p*H, contains free mandelic acid.

CASES TREATED WITH CALCIUM MANDELATE

Type of case.	Number.	Cured.	Failures.
Pyelitis—			
Recent acute	13	12	1*
Chronic	5	1	4†
Pregnancy	1	—	1‡
Puerperal	4	3	1§
Cystitis—			
Acute	2	2	—
Chronic and bacilluria ..	8	7	1‖
Total	33	25	8

75 per cent. cured.

Failures.—* Ovariotomy, acute pyelitis, cured, relapsed, discharged herself.
† (*a*) Urine never acid. Auricular flutter, died from cerebral embolism. (*b*) Not completely treated or investigated. (*c*) ? Functionless kidney. (*d*) Hypertension. Recent albuminuria of pregnancy. Blood-urea 32 mg. but difficulty in acidifying urine.
‡ Pregnancy.
§ Puerperal. ? Ureteric calculus.
‖ Cystocele. Residual urine.

CLINICAL RESULTS

We have confirmed the fact that calcium mandelate is an effective urinary acidifying agent, both in normal subjects and in patients with urinary infections. In 2 patients with complete achlorhydria, the salt also rendered the urine acid, indicating that the splitting of the insoluble calcium mandelate does not require the presence of hydrochloric acid.

The dosage, as with all mandelic acid preparations, is that containing the equivalent of 3 grammes of mandelic acid and this dose is given four times a day after meals. In the case of pure calcium mandelate

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the dose is 3·5 g., or of mandecal 4·5 g. With children above the age of six, two-thirds of the adult amount has been given with no ill effect. The fluid intake should be limited to two pints a day.

Almost always the urine rapidly becomes acid, the *p*H falling to about 5·0; of a series of 32 cases it has been necessary to give additional ammonium chloride in only 4, and in 2 of these renal function was probably impaired.

The results obtained with the new salt compare favourably with previous reports and are summarised in the accompanying Table. The 8 failures include 1 patient who died of intercurrent disease, whilst in another case the treatment was never satisfactorily completed. In the 6 others that were resistant to treatment, some reason for the failure was apparent (see Table).

There is no reason to believe that the new preparation will give better results than those that are obtainable with ammonium mandelate, but the calcium salt is pleasant to take, and appears to produce less gastric irritation. Nausea occasionally occurs but usually passes off after a day or two or can be avoided by giving the drug in different time-relation to the meals. Hryntschak states that it should not be used for longer than ten days at a time, for he found that after this time nausea and a dislike of the medicine appeared. It is rarely necessary to give any form of mandelic acid for more than a fortnight, but no ill effects have been observed following longer administration.

The contra-indications to the treatment are the same and where there is renal failure calcium mandelate is no more suitable than other preparations of mandelic acid. It has been used in one or two instances in the presence of pyrexia with favourable results.

It seems possible, at the present time, that the sulphanilamide group of drugs may prove the most effective form of treatment for urinary infections, but in many cases mandelic acid is likely to remain the drug of choice. This new salt offers certain advantages over previous methods of administration.

SUMMARY

Calcium mandelate has been tried in a series of 33 cases of urinary infection.

It is an efficient urinary acidifier, pleasanter to take and less irritant than other preparations of mandelic acid.

Our thanks are due to the various members of the staff of University College Hospital and to Dr. Humphrey Nockolds of Lewisham Hospital for their kind permission to treat their cases. We are also indebted to the British Drug Houses Ltd. for supplying us with the calcium mandelate and later with the Mandecal used in the treatment of these patients.

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INTERNATIONAL CONGRESS OF COSMOBIOLOGY.—The first International Congress of Cosmobiology will be held on the Côte d' Azur at Whitsun from Juné 2nd to 6th. The congress is being organised by the Société Médicale de Climatologie et d'Hygiène du Littoral Méditerranéen. Prof. d'Arsonval will preside over the radiology section and Monsieur A. Lumière over the biology section. The secretariat of the congress may be addressed at 24, Rue Verdi, Nice.

INFECTION WITH *BRUCELLA ABORTUS* TREATED WITH PRONTOSIL

BY L. AYLWIN RICHARDSON, M.B. Camb., F.R.C.S. Eng.

SURGEON TO THE CHILDREN'S HOSPITAL, SOUTHAMPTON

IN a series of 115 cases Creed (1936) found that the duration of attacks of abortus fever varied from 3 to 39 weeks, with an average of 12½. Most forms of treatment have so far proved unsatisfactory, though Fouadin has been recommended and success with injections of killed typhoid bacilli is reported (Ervin and Hunt 1937). In view of the success achieved with sulphanilamide in various other infections, I decided to try Prontosil in two cases of *Brucella abortus*.

CASE 1.—The illness started suddenly with high fever, frequent rigors, and profuse sweating. By the end of a week the patient, a man of 46, was seriously ill and his serum agglutinated *Brucella abortus* up to dilutions of 1 in 500. As soon as the diagnosis had been made, two 0·3 g. tablets of Prontosil album (sulphanilamide) were given twice a day with an intramuscular injection of 5 c.cm. of the 5 per cent. solution of Prontosil Soluble on each of four consecutive days. The result was dramatic: symptoms disappeared, the temperature dropped rapidly (Fig. 1), and an ill man became quickly convalescent. On the 14th day of the disease it

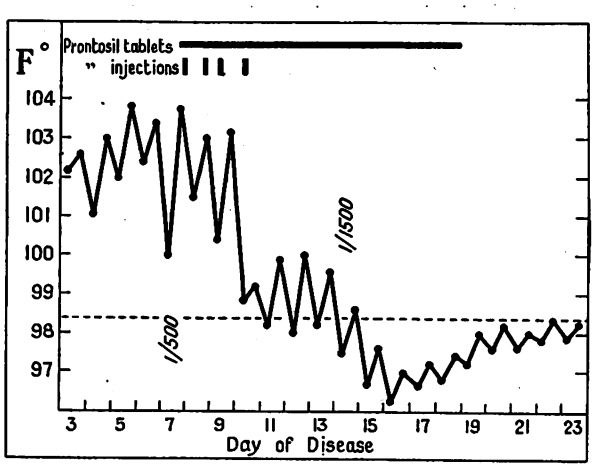

FIG. 1.—Temperature chart in Case 1 (original attack).

was found that the patient's serum agglutinated *Br. abortus* up to 1 in 1500, and this was taken as clinching the diagnosis. A fortnight later he left for a ten-day cruise, but when he had been home a little over a week he sent for me complaining of headache, aching limbs, and general malaise. I found that he was now running an evening temperature of between 100° and 102° F. I immediately put him to bed and reinstituted prontosil treatment for six days, after which his temperature remained steadily normal. One week, three weeks, and six weeks later I told him to take three prontosil tablets daily for six days. He had no rise of temperature during that time, nor has he had a relapse since.

CASE 2.—The second patient, aged 63, had been in bed with abortus fever for twelve weeks in another part of the country. Two months later he was staying in my district and became suddenly ill with a rigor and high temperature. On questioning him I found that ever since his first attack he had been feeling ill and had often found his evening temperature to be between 99° and 100° F. I gave him two

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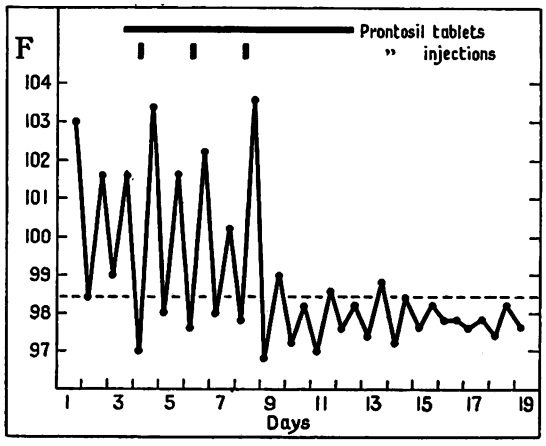

FIG. 2.—Relapse in Case 2.

tablets of prontosil album three times a day and an intramuscular injection of prontosil soluble on alternate days for six days. He became slightly cyanosed and short of breath, but his temperature fell to normal (Fig. 2) where it has since remained. To him also I gave short courses of the tablets, one, three, and six weeks later.

It is of interest that in the second case the patient's temperature seemed to rise in the evening of the days on which he had his prontosil injections. Ervin and Hunt (1937) note "that most successful treatments are accompanied by a sharp thermal reaction. This is true regardless of whether the treatment given is administration of a vaccine, toxic filtrate, specific serum, chemical or foreign protein, or fever produced by mechanical appliance." They go on to say that "it must be noted, however, that numerous cures have been reported when no thermal reaction was induced by the medicament and one must not forget that spontaneous recovery often takes place."

These two cases are reported in the belief that abortus fever and its relapses can be controlled with sulphanilamide compounds, and in the hope that others will try this remedy.

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SULPHANILAMIDE IN THE TREATMENT OF UNDULANT FEVER

By A. E. Francis, M.D., M.R.C.P. Lond.

SENIOR DEMONSTRATOR OF PATHOLOGY IN THE MEDICAL COLLEGE, ST. BARTHOLOMEW'S HOSPITAL, LONDON

Several cases of undulant fever due to *Brucella abortus*, in which success has been claimed for treatment with sulphanilamide or with Prontosil, have been published, chiefly on the Continent (Grouès 1936, Suchier 1937, Berger and Schnetz 1937, Ahringsmann 1937, Lloyd 1938). This paper records two cases in which a similar success appears to have been achieved, with a note on the sensitivity of *Br. abortus* to sulphanilamide in vitro.

CASE RECORDS

Case 1.—Miss T., aged 46, returned from South Africa to England, and a few days later complained of fever and generalised aching pains, with cough and dark sputum. She was thought to have bronchopneumonia. After three weeks in bed she got up, but a week later the fever and pain returned. After another week she was admitted to St. Bartholomew's Hospital under the care of Dr. George Graham (May 21st, 1937). Her only abnormal physical signs were those of an enlarged heart with a mitral systolic murmur, the scar following the removal of one breast for mastitis seven years before, and a tender liver palpable two fingers-breadth below the costal margin. The spleen was not palpable. Serum agglutination reactions were negative for the enteric group, but *Br. abortus* was agglutinated to a standardised titre of 1 in 800, and *Br. melitensis* to a standardised titre of 1 in 66. A blood culture, taken on the same day, gave after ten days' incubation in 10 per cent. CO_2 a growth of *Br. abortus*, while tubes incubated without CO_2 remained sterile. The organism remains CO_2-sensitive after several subcultures.

Treatment with 200 grains of sodium salicylate daily for two days had no effect on the fever, as shown by the chart (Fig. 1). Treatment with sulphanilamide was begun on June 7th, 3·0 grammes a day being given. On June 12th treatment was discontinued because the patient became cyanosed. It was found that phenacetin had been given for the relief of her pains at the same time as the sulphanilamide, and that she had developed a mild methæmoglobinæmia, which rapidly disappeared on stopping both drugs. Her pains and fever then disappeared, and she remained free of symptoms until her discharge three weeks later. A report has been received from her in South Africa, dated Dec. 15th, 1937, saying that she has remained well.

Case 2.—Mr. C. J., aged 32, a hospital-equipment adviser, was admitted to St. Bartholomew's Hospital under the care of Dr. F. G. Chandler on August 10th, 1937, with the story that he had been staying at a farm five weeks before, where he had consumed much raw milk and had assisted at the birth of a calf. A fortnight later there was a sudden onset of malaise, headache and backache, fever and sweating. After three days in bed he got up, but felt weak and returned to bed. Night sweats were profuse, but he felt well during the day. After a fortnight he was afebrile for four days, but the fever returned and persisted.

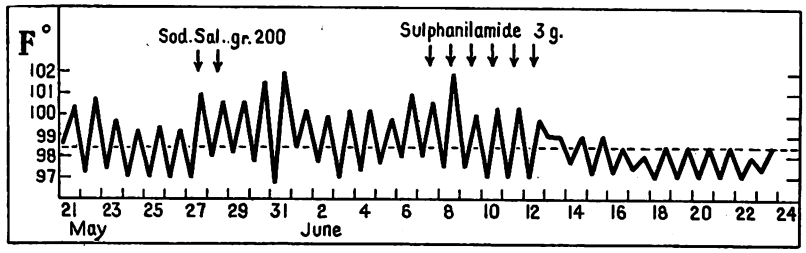

FIG. 1.—Temperature chart in Case 1.

He was a well-built man, and on admission he showed no abnormal physical signs. The spleen was not palpable. Hæmoglobin 96 per cent., white cells 9000 per c.mm. His serum agglutinated *Br. abortus* to a titre of 1 in 800 + + (1 in 1600 +), but the organism was not grown on blood culture. While he was still febrile, though the temperature tended to fall, treatment with sulphanilamide was begun, and 3·0 g. was given daily for five days (Fig. 2). He became afebrile and free of all symptoms, and was discharged

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on Sept. 5th. A report has been received from him, dated Jan. 19th, 1938, stating that he has remained in good health.

EXPERIMENTS IN VITRO

Although there is some doubt about the relation of the action of sulphanilamide in vitro to its therapeutic activity, the following experiments suggest that the drug should receive further trial in undulant

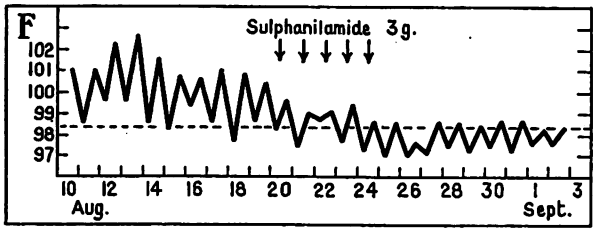

FIG. 2.—Temperature chart in Case 2.

fever. The results quoted for the strain isolated from Case 1 are substantially the same as those obtained with two other strains tested in the same way ("Astor," supplied to me by Prof. L. P. Garrod, and previously obtained from Prof. G. S. Wilson, and "R.G.C.," supplied by Prof. Garrod). In each experiment tubes containing 4 c.cm. of heart-extract broth, of such strength that the addition of 1 c.cm. of distilled water made them up to standard concentration, were used, and 1 c.cm. of a suitable solution of sulphanilamide was added. The tubes were then inoculated with 0·1 c.cm. of diluted broth cultures of the organisms. An experiment was done in duplicate with *Streptococcus pyogenes* ("Richards") and the results are given for comparison in Tables I and II.

These results appear to show that *Br. abortus* is considerably more susceptible to the action of sulphanilamide in vitro than is *Strept. pyogenes* under the same conditions.

TABLE I—*Streptococcus pyogenes* (Richards)

Inoculum.	Concentration of sulphanilamide (per cent.).							
	0·1	0·05	0·02	0·01	0·005	0·002	0·001	Control.
10,000	++	++	++	++	++	++	++	+++
1,000	+	+	+	++	++	++	++	+++
100	Tr.	+	+	+	+	+	+	+++
10	0	0	0	Tr.	Tr.	+	+	+++
1	0	0	0	0	0	Tr.	Tr.	+

Readings = Turbidity in tubes after 24 hours at 37° C.

TABLE II—*Brucella abortus* FROM CASE 1

Inoculum.	Concentration of sulphanilamide (per cent.).							
	0·1	0·05	0·02	0·01	0·005	0·002	0·001	Control.
200,000	0	Tr.	Tr.	Tr.	+	++	++	++
20,000	0	0	0	0	Tr.	Tr.	+	+
2,000	0	0	0	0	0	Tr.	Tr.	+
200	0	0	0	0	0	0	Tr.	+
20	0	0	0	0	0	0	Tr.	+

Readings = Turbidity in tubes after four days at 37° C., controlled by agar-slope subcultures after two days, which were incubated for a further two days, all in 10 per cent. CO_2.

I am greatly indebted to Dr. Graham and to Dr. Chandler for permission to publish these cases, and to Prof. Garrod for his advice.

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MEDICAL SOCIETIES

TUBERCULOSIS ASSOCIATION

AT a meeting of this association, held in London on Feb. 18th, with Dr. S. R. GLOYNE, the president in the chair, Dr. G. S. TODD (Midhurst) read a paper on the

Termination of Artificial Pneumothorax Treatment

The statement, he said, was frequently made that pneumothorax should be kept up for a minimum period of two years and that it could generally be terminated within four years. This was a most misleading generalisation, since the question depended materially upon the type of lesion for which the treatment was instituted, ranging from the very early case with a small amount of infiltration in one lung and a complete absence of symptoms, up to the long-standing case with thick-walled cavities. In the first group obliteration could probably be safely allowed within two years, and in the last group the collapse should, if possible, be kept up permanently. In between these extremes were cases of fibrocaseous disease, others of acute broncho-pneumonic type, and yet others of thin-walled cavities. For most of these the length of treatment varied according to the progress made in each individual case. The duration of A.P. should always be reckoned from the time of complete and adequate collapse of the diseased lung area, and not from the date of the original induction. As a general rule, re-expansion might be considered when the completely collapsed case had reached what was regarded as a normal period for its type of disease, always with the proviso that the patient had been completely free from all symptoms for at least 9 to 12 months. Among the complications which might hinder re-expansion or make it hazardous were:—

(1) Excessive formation of tough fibrous tissue encapsulating a lesion.
(2) Pleural effusion resulting in a thickened visceral pleura.
(3) Unequal expansion of upper and lower lobes, in which an apical thoracoplasty might later become necessary.

Re-expansion of a collapsed lung should always be carried out slowly, in order to allow the necessary adjustments to take place, and to ensure that reactivation of the disease would not occur. Air should be introduced at increasing intervals and in smaller amounts, each being carefully controlled by screening. If during re-expansion the extrapleural pressure became too negative, and if re-expansion was causing too much pull upon the diseased lung or too much displacement of heart and mediastinum, pleural evulsion should be carried out. The process of termination should take on an average from three to six months, according to the previous duration of the treatment.

Abnormal terminations of A.P. were sometimes advised for one of four reasons:—

(1) Contraselective collapse.
(2) Spread of disease to sound lung.

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(3) Presence of effusions.
(4) Presence of other conditions—e.g., asthma, prolonged dyspnœa, &c.

With regard to (1) the speaker believed that in very few cases was it necessary to terminate the A.P. Even in (2) nothing short of a massive spread to the opposite side would convince him of the necessity of abandoning the original pneumothorax. He was not in favour of embarking on a bilateral A.P. if disease in the other lung could be controlled by other means—e.g., by Sanocrysin. With regard to (3), a simple pleural effusion should never lead to an abandonment of the A.P., nor should aspiration be carried out too early. Tuberculous effusions, however, should be gas-replaced, if necessary repeatedly, followed later by pleural wash-outs given in order to help termination of the A.P. by removing thick fibrin from the visceral pleura and by promoting re-expansion of the lung as far as possible. This would greatly reduce the size of the thoracoplasty that would eventually be required. Effusions secondarily infected with other organisms were extremely serious, and the fluid would have to be aspirated daily. For cases in group 4 with asthma or marked emphysema, the lung should be allowed to expand in the ordinary way, the patient then being treated by sanatorium methods.

Vitamin-C Deficiency

Dr. J. V. HURFORD (Colindale) speaking on hypovitaminosis C in pulmonary tuberculosis discussed the results of an investigation on 66 patients at Colindale Hospital. Taking the minimum normal limit of vitamin-C excretion in urine as 14 mg. per 24 hours, it was found that 64 per cent. of the patients tested showed a hypovitaminosis, 25 patients having a daily excretion below 8 mg. Among the possible factors responsible for the deficient excretion, diet did not apparently play a leading part, for with large test doses of ascorbic acid (equivalent to from one to two pints of orange juice) only 50 per cent. of the patients showed a rise in the excretion above the minimum normal reading. On the question whether hypovitaminosis C reflected the clinical condition in pulmonary tuberculosis or could be used as a guide to prognosis, the speaker had found no constant relation between vitamin-C excretion and the sedimentation-rate, von Bonsdorff count, or the extent of the disease; nor did the response to test doses over a short period give any guide to the clinical condition. As regards treatment, ascorbic acid was given to 42 cases, for periods ranging from two days to three months, but the only cases in which a significant improvement was shown were 7 patients with a microcytic anæmia. Dr. Hurford concluded by saying that since there is in tuberculosis a definite nutritional defect, it would be foolish, in a disease which takes so long to treat, not to attempt to correct this, especially as the low excretion of vitamin C appears to indicate increased need of the tissues for it, for some purpose which is not yet clear.

Contact Examination

Dr. E. K. PRITCHARD (Southwark) suggested that the value of contact examination was nil unless it was intelligently carried out. While theoretically the ideal procedure might be a biannual examination of every contact, such a scheme was obviously completely impracticable; and even were it not so, it would probably have no greater ultimate effect on the incidence of tuberculosis than a careful examination restricted mainly to the adolescent and adult contact. Such an examination should be conducted with as much care as that of a new case sent up for diagnosis. The speaker urged that the X ray plant should be actually in the dispensary, contact work alone amply justifying the expense. Routine contact examination was unnecessary and even undesirable, tending as it did to produce a permanent feeling of apprehension. While the examination of adolescent and adult contacts justified the time spent on it, he doubted whether this applied to children, in whom pulmonary tuberculosis was not common, and who in any case were under the observation of welfare clinics and school medical service. Doubtful cases could always be referred to the dispensary. The efficiency of contact work was too often judged by impressive but meaningless figures, and the speaker urged that the quality of the work and the discrimination used in it should be given greater recognition.

"A Lost Art"

Dr. W. M. MCPHAIL (Burrow Hill) said his subject was less the treatment of symptoms than the modern change of attitude towards them. In studying the works of some of the great phthisiologists of the nineteenth century—works which were indeed out of fashion, but could never be out of date—he had been struck by their attitude towards symptoms, and he asked why these had ceased to be of interest to modern chest physicians. The subject was comparatively neglected in text-books and articles in current literature, and was seldom touched on at meetings of their own association. The middle of the last century was the great age of morbid anatomists, whose observations were extremely accurate and on whose reports of cures there could be complete reliance. Among the causes responsible for this change of attitude was the altered outlook illustrated by the title of the recent presidential address "From Consumption to Pulmonary Tuberculosis"—i.e., a change from a well-defined clinical entity based on morbid anatomy, to a large group of clinical conditions based on a bacteriological concept. Another cause was the recent rapid and rather haphazard development of the antituberculosis service, leading to less continuity of interest. Formerly there was one physician for the individual patient; now the patient was referred to various specialists and institutions. Studies of phthisis in the old days were studies of individuals; now there were studies of the aspects of disease in large groups of patients. Symptomatic or palliative treatment was an art which was neglected and was in danger of being forgotten or lost. Advanced and chronic patients were less well off to-day in the way of treatment than they were formerly, and the speaker urged that practitioners and hospital residents should get a better lead from experienced phthisiologists, and that discussions on symptoms should be included in the programmes of the association.

PATHOLOGICAL SOCIETY OF MANCHESTER

AT a meeting of this society on Feb. 9th, with Dr. LOUIS SAVATARD, vice-president, in the chair, a paper on

Town-dweller's Lung

was read by Dr. JAMES DAVSON. Anthracosis in town-dwellers, he said, was due to the inhalation of siliceous dust along with carbon, and a study of 94 lungs which were free from gross pulmonary disease showed, by the technique of micro-incineration, that carbon and silica existed together throughout.

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Siliceous dust accumulation was greatest in the apical region and in elderly subjects. Histological examination of apical pleural scars showed that the majority contained no evidence of past tuberculosis; they appeared to develop secondarily to accumulation of siliceous dusts at the apex. In some cases the intensity of siliceous dust accumulation in apical scars was quite comparable to that seen in cases of true silicosis, yet the subjects had not been especially exposed to silica dust inhalation. In a number of these cases actual silicotic nodule formation was observed in the sites of most intense silica accumulation.

If so many of these apical scars were not tuberculous, the truth of the view that the majority of adults develop and recover from apical tuberculosis could be questioned and more stress should be laid on the factor of infection and less on the factor of individual immunity in the pathogenesis of pulmonary tuberculosis. This view should stimulate the efforts of public health workers towards the attainment of the complete and permanent segregation of the patient with "open" pulmonary tuberculosis.

Siliceous dusts were known to encourage the growth of tubercle bacilli in the tissues; therefore the inhalation of such dusts from the atmosphere of towns must have a deleterious effect on the patient with pulmonary tuberculosis. Therefore no patient known to have pulmonary tuberculosis should ever be allowed to return to town life. An example of what could be done on these lines was the Papworth Village Settlement.

ROYAL SOCIETY OF MEDICINE

SECTION OF MEDICINE

AT a meeting of this section on Feb. 22nd, with Dr. H. LETHEBY TIDY, the president, in the chair, a discussion on

Mineral Salts in Therapy

was opened by Dr. R. A. MCCANCE. He proposed that the discussion should be limited to the use of the more physiological minerals, and he confined his own contribution to treatment with sodium chloride. To appreciate and understand sodium therapy it was essential, he said, to remember that the metabolism of this element was closely tied up with the metabolism of water. About 60 per cent. of the body was water. Roughly two-thirds of the body water was in the body cells, and the remaining third was in the blood plasma, lymph, cerebro-spinal fluid, and intercellular spaces. Recent work strongly suggested that the osmotic pressure of the cellular fluids was always equal to the osmotic pressure of the extracellular fluids. If this was true it followed that when the osmotic pressure of the extracellular fluid was altered the osmotic pressure of the cellular fluids would change correspondingly. Whereas the bulk of the cellular osmotic pressure was due to potassium salts that of the extracellular fluids was due to sodium salts. Though there were exceptions—e.g., the red blood-cell—the cellular membranes were for the most part freely permeable to water but not to sodium and potassium or indeed to the other metallic radicles. Forced removal of water from the body (if such a procedure were possible without the simultaneous removal of sodium ions) or reduction of water intake produced a general dehydration in which the intra- and extra-cellular fluids suffered equally. The volumes of both fell and the osmotic pressures of both rose. Such a state might be encountered after any surgical operation on the stomach which prevented the patient taking fluid by mouth; it was quite distinct from shock and required different treatment. If the water deprivation became at all severe, secondary changes supervened, for the reduction in the volume of the extracellular fluids, particularly the blood and lymph, prevented the normal exchange of metabolites between blood and the tissues. The functional capacity of the kidneys was reduced by the diminution of blood volume and by the fall in blood pressure if any. This state of generalised dehydration could be completely cured by administration of water alone. It was unnecessary and unwise to give saline.

Forced removal of sodium from the body without any deprivation of water led to a totally different picture. Deprived of some of its sodium, the body was faced with two alternatives or a compromise between them. Firstly it might excrete the water with which the sodium was associated and so maintain the osmotic pressure of the body fluids generally in statu quo at the expense of a reduction in the volume of the extracellular fluids. Secondly it might maintain the volume of its extracellular fluids in statu quo and allow the osmotic pressure to fall. (The rabbit sometimes did this.) The moment the osmotic pressure of the extracellular fluids began to fall the osmotic pressure of the cells probably began to fall also, and, since the cell membranes were impermeable to sodium and potassium, the osmotic pressure of the cells could only fall by the cells taking up water. Thirdly the body could compromise between a reduction in the volume of its extracellular fluids and a reduction in their osmotic pressure. This was what happened in man and apparently in most animals. The result might be a severe reduction in the volume of the extracellular fluids with signs of anhydræmia—namely, a rise in the percentage of hæmoglobin and plasma proteins. Yet combined with this there might be a lowered serum sodium and a state of over-hydration of the cells. The reduction in blood volume had the effect already described, and the exchanges of metabolites between the cells and the plasma was further interfered with in a sodium deficiency by the swelling of the cells which compressed the lymphatic vessels and tissue spaces. Furthermore the kidney for some reason unknown could not produce a copious diuresis after the injection of a large quantity of water. This syndrome could be cured only by the administration of salt; water was of no avail. Saline must therefore be given to all patients who had lost salt either from sweating, vomiting, or diarrhœa or one of the rarer causes. It did not matter how it was given. It could be given by mouth if the patient could tolerate it and could be given by rectum since sodium salts are absorbed by the large intestine. But it was best given intravenously.

Any large measure of œdema was necessarily associated with excessive amounts of sodium in the body and an increased volume of the extracellular fluids. The most effective treatment was to remove the salt from the body, for if this was done the water would be excreted automatically by the kidney. Therefore if a salt-free diet was being used to reduce œdema, it was unnecessary to restrict the water intake as well. Diuretin appeared to act by forcing the kidney to excrete sodium chloride and its success in the treatment of œdema depended on this. Some animals could be made salt-deficient and killed by large doses of diuretin. The treatment of œdema always demanded caution. Some patients with œdema had an abnormally large blood volume; others had not. It might not be possible to remove the œdema without reducing the blood volume so much that signs of anhydræmia and salt deficiency supervened.

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Dr. R. S. AITKEN dealt with recent work on the treatment of family periodic paralysis. A young man of 21, who was admitted to St. Alfege's Hospital in May, 1935, gave a history typical of this rare condition. From the age of 14 he had suffered, at intervals of days or weeks, from attacks of flaccid paralysis affecting all four limbs and the muscles of the back and the neck. Attacks began typically in the night during sleep; unusual exertion or a heavy meal in the evening or excessive consumption of sweets often seemed to him to bring on attacks; they lasted 8–48 hours and passed off gradually and spontaneously. Dr. Mary Walker, who had charge of the patient, found that she could induce nocturnal attacks at will by giving him 150–225 grammes of glucose by mouth in the evening. Dr. E. N. Allott was asked to see him, and, arguing from the observed rapidity of onset and offset of the paralysis, suggested an abnormal behaviour of electrolytes, in the blood and the muscles, as the likely mechanism; he had in mind phosphorus, potassium, and lactic acid, as the electrolytes known to be associated with carbohydrate metabolism. He made a complete electrolyte analysis of the patient's blood during an induced attack and again in an interval, and found no significant alteration in any constituent except the serum potassium, which during the attack was reduced to about half its normal concentration of 16–20 mg. per 100 c.cm. This important observation was confirmed in 1936 in a spontaneous attack, and shortly afterwards it was shown on Dr. Allott's suggestion that the administration of 12 grammes of potassium chloride by mouth caused complete return of power to paralysed limbs within an hour. In 1937 the patient was under observation for a longer period in Hammersmith Hospital, where Dr. L. I. M. Castleden and Dr. Allott repeated and confirmed those findings many times. It was found that insulin also would induce attacks, the paralysis coming on not during the hypoglycæmic phase but after the blood-sugar had begun to rise, four or five hours after the injection. Simultaneous administration of insulin (10 units) and oral glucose (25 grammes) every hour would regularly induce an attack, the weakness beginning about the fourth or fifth hour and reaching complete paralysis an hour or two later. These procedures were all shown to bring about, in normal individuals, a fall in serum potassium of several milligrammes per 100 c.cm., but in the patient they produced a much greater fall, and in him whenever the level went below 10–12 mg. paralysis developed. When potassium chloride was given by mouth the serum potassium rose to normal levels or higher, and the paralysis promptly passed off.

It was concluded that this patient's serum potassium was unduly labile, fluctuating widely with alterations in carbohydrate transport, and further that the neuromuscular or muscular mechanism in his limbs was in some way sensitive to low serum potassium concentrations, which inhibited contraction. It had also been shown that adrenaline injections brought about a fall of serum potassium in normal human subjects, and in a certain proportion of patients with periodic paralysis adrenaline induced attacks. Just how adrenaline, insulin, and sugar came to affect serum potassium was still obscure, nor was it clear why lowering of serum potassium paralysed the patient's muscles. Dr. Aitken concluded with quotations from several writers of 25 to 40 years ago, each of whom claimed that his own treatment either shortened or prevented attacks of periodic paralysis; their prescriptions all contained potassium bromide, potassium citrate, potassium acetate, or some other potassium salt.

Dr. C. L. COPE called attention to the possible toxic effects of mineral salts used in treatment. These substances all contained both basic and acidic radicles, which after absorption into the body behaved independently; where the therapeutic effect of the one was desired the risk of a harmful effect from the other must be remembered. He recalled a case of a hæmorrhagic blood disease in which an increase of calcium in the blood was desired. Calcium chloride was given by mouth; the calcium was mostly excreted by the bowel while the retained chlorine gave rise to a dangerous acidosis. In that case calcium lactate would have been preferable. In most instances the excretory function of the kidney protected the body against the accumulation of a harmful radicle. Even the normal kidney, however, could not distinguish bromide from chloride, and so it was possible for chronic bromide intoxication to result from long-continued bromide administration, while with the nephritic kidney, and the functionally depressed kidney—as in diabetic coma, dehydration, and alkalosis—the dangers of retention of ions would be greater. Dr. Cope suggested that the generalised œdema in diabetics in pre-insulin and early insulin days might have been due to the large doses of sodium bicarbonate often given. He quoted Blum's observation of potassium poisoning—colic, diarrhœa, and circulatory collapse—occurring in nephritics to whom potassium chloride was given while they were on low-salt diets. A similar danger might arise if potassium citrate were pushed in cases of pyelitis with coincident renal damage, and even if sodium citrate is used instead in such patients enough sodium might be retained to produce a serious alkalosis. Since the urine in those circumstances often remained acid or neutral, the physician was tempted to increase the dose of alkali; he had seen such a case with a blood-urea over 300 mg. per 100 c.cm., which recovered in 20 days after suspension of alkali. Similarly magnesium, absorbed from magnesium sulphate given as a purgative to chronic nephritics, had been shown to accumulate in the blood up to concentrations of 10 to 15 mg. per 100 c.cm. These approached the concentrations that produce coma, and he wondered how often the drowsiness of uræmic patients was contributed to by magnesium sulphate; the use of this purgative might be responsible for the undue sensitivity of uræmic patients to morphia which Osler used to emphasise. In the alkali poisoning that occasionally occurs in patients taking alkaline powders (containing magnesium) for peptic ulcer, the kidney function was temporarily impaired and Dr. Cope had found plasma magnesium values of three times the normal. He suggested that this might be a factor in producing the depression, mental lassitude, irritability, and drowsiness that are a feature of clinical alkalosis, and he thought it likely that milder degrees of this condition often go unrecognised, especially in patients taking alkaline powders on their own initiative. The rise of magnesium was also accompanied by a rise of serum calcium to 16–18 mg. per 100 c.cm.; he was not clear whether this in itself was harmful, unless it were responsible for the renal calcification reported by Cooke in some patients dying of pyloric obstruction. Those examples all illustrated the principle that apparently harmless mineral salts might not be devoid of toxic action, especially when the kidneys are no longer able to correct the electrolyte disturbance they produce.

Dr. J. F. BROCK spoke of the interrelationships of

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mineral substances in the gastro-intestinal tract. The Steenbock diet, containing a great excess of calcium over phosphorus, made rats rachitic in three weeks. He had shown that great excess of iron in the diet had the same effect, and other workers had obtained similar results with magnesium, strontium, and beryllium. In all these cases the substance in excess formed an insoluble compound with the dietary phosphorus in the gut, preventing its absorption, and causing rickets through phosphorus deficiency. He had shown, however, that even the large doses of iron now used therapeutically in man were insufficient to impair the absorption of phosphorus from a normal diet to any significant extent.

Sir WALTER LANGDON-BROWN referred to a case in which potassium citrate given for pyelitis caused an alkalosis with a blood-urea of 160 mg. per 100 c.cm.

Dr. A. M. COOKE said that a further 60 cases of alkali poisoning from alkaline powders had been reported in the last six years, and he agreed that the condition must often go undetected.

Dr. E. N. ALLOTT mentioned a case in which hypertonic saline given in mistake for normal saline to a dehydrated patient with Addison's disease made the clinical condition worse by increasing the extracellular fluids at the expense of the intracellular. He said that later work on the periodic paralysis cases showed that the fall in serum potassium was not due to a loss of potassium through the kidneys.

Mr. TERENCE CAWTHORNE described work in progress on the treatment of aural vertigo. On an ordinary diet, increased water intake aggravated the patient's symptoms and measurably diminished their hearing, especially for high tones, while restriction of water intake to 20 or 30 oz. daily had the opposite effect. A sodium-free diet, which had been shown in America to abolish attacks of vertigo, was scarcely feasible therapeutically, but a low-sodium diet with strict limitation of fluid intake promised to be of considerable value.

The PRESIDENT asked whether the division of body fluids into intra- and extra-cellular was not somewhat artificial, and how well founded was the assumption that both have the same osmotic pressure.

Dr. MCCANCE, in replying, said that all the evidence so far went to support the assumption; it was good evidence but it was confined to experiments of quite short duration. The mechanism of œdema, he added, was still to a large extent obscure.

REVIEWS AND NOTICES OF BOOKS

Collected Papers on Tuberculosis

By Sir ROBERT W. PHILIP, M.D., F.R.C.P., Extra Physician to the King in Scotland; Consulting Physician, Royal Infirmary, Edinburgh; Professor of Tuberculosis and Examiner in Medicine, Edinburgh University. London: Humphrey Milford, Oxford University Press. 1937. Pp. 460. 21*s*.

THIS volume contains reprints of twenty-four articles and addresses of the years 1898 to 1934, arranged as far as possible in chronological order. It is in reality a collection of essays from the pen of a man who, despite early opposition and discouragement, did pioneer work in tuberculosis and to whom every consumptive to-day has reason to be grateful. The early chapters deal with the realisation that tuberculosis is a communal disease, the foundation of the first tuberculosis dispensary at Edinburgh and the dawn of ærotherapy in treatment. The reader familiar with the social aspect of tuberculosis to-day will find it hard to believe that, at the close of last century, the advent of phthisis in a young bread-winner spelt starvation for himself and his family. In the early days of the Edinburgh scheme the only people who dispensed treatment and necessary charity were four physicians, three of them honorary, and a Samaritan committee of ladies. In the ensuing pages, however, we can follow the gradual change that took place. First the voluntary and later the compulsory notification of the disease, and then the final recognition by the local authorities of tuberculosis as a social evil that demanded attention, with the consequent extension of the dispensary system and the collateral development of sanatoria and farm colonies. Some of the papers are in a more general vein. The concluding address, "Musings in the Garden," is a pleasing summary of what has gone before. The book should be read by anyone engaged in tuberculosis work; it will appeal especially to those who, like the writer, have always kept in mind the common weal.

Diseases of the Nervous System

In Infancy, Childhood and Adolescence. By FRANK R. FORD, M.D., Associate Professor of Neurology, The Johns Hopkins University. London: Baillière, Tindall and Cox. 1937. Pp. 954. 38*s*.

THERE are still some senior clinicians who hold that the differentiation of pædiatrics as a specialty is unjustified, since after perhaps the first year of life the manifestations of disease are much the same in childhood and in later life. This might be thought to be peculiarly true of neurology for the number of ways in which the nervous system reacts to disease is strictly limited, and the symptoms of meningitis, for example, or an intracranial tumour vary but little with the age of the patient. Dr. Ford's comprehensive book, however, amply illustrates the existence in childhood of a very large number of neurological disorders which are only occasionally seen by the "adult" neurologist, partly because they are in themselves rare, and partly because they are often associated with mental or physical disabilities which lead to the segregation of their victims in special institutions. Dr. Ford has himself made valuable contributions to the study of the manifestations of nervous diseases in childhood, and though his work naturally covers much the same ground as an ordinary text-book on nervous diseases, its special emphasis is upon the disorders entirely or mainly restricted to children and on the special manifestations in childhood of disorders which may occur at any age. The first few chapters are on the examination of the nervous system and applied anatomy and physiology. Prenatal diseases are then discussed at considerable length and the account of the heredito-familial and degenerative diseases is very complete. The arrangement of the rest of the subject matter follows in general the plan usually adopted in text-books of nervous diseases. The only serious omission in the book, which is thoroughly up to date, is that of any reference to functional nervous disorders. There is something to be said against the inclusion of such a large subject as a mere appendix to a text-book

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on organic nervous diseases, but hysteria, which is not uncommon in children, surely requires consideration if only for diagnostic purposes. The book is well illustrated, except that radiograms of the skull in conditions of increased intracranial pressure might usefully have been included, and each section is followed by a brief but useful bibliography. Dr. Ford has satisfied a real need and both pædiatricians and neurologists will use his book.

Muir and Ritchie's Manual of Bacteriology

Tenth edition. Revised by CARL H. BROWNING, M.D., D.P.H., F.R.S., Gardiner Professor of Bacteriology, University of Glasgow; and THOMAS J. MACKIE, M.D., D.P.H., Irvine Professor of Bacteriology, University of Edinburgh. London: Humphrey Milford, Oxford University Press. 1937. Pp. 996. 20*s*.

THE appearance of a tenth edition of "Muir and Ritchie" on the fortieth anniversary of its first publication calls for something warmer than a passing remark. Since its first publication it has occupied a unique position among the text-books of bacteriology. Beginners and experts alike found it indispensable. Its soundness became proverbial and to quote from it was to silence criticism. The modern growth of bacteriology has made it impossible for a manual to continue to occupy so masterly a position. Many excellent large books have appeared under the title of systems, principles, and text-books, but those who are neither too strong in the head or in the arm may be thankful to find a book that can still be properly called a manual. The final withdrawal from the editorship of the great pathological teacher who was the senior author may have given rise to a little hovering, but the new editors have now got into their stride and the work as it stands is compact, consistent, and authoritative. But the format might be better.

Essentials of Pharmacology, Materia Medica and Therapeutics

For Medical Students. By D. M. MACDONALD, M.D., F.R.C.P.E. London: Henry Kimpton. 1938. Pp. 279. 7*s*. 6*d*.

THE motive behind this addition to the already large number of text-books on pharmacology is "to impress on the student the wisdom of a wider and more practical knowledge of pharmacy and materia medica." The arrangement is alphabetical and follows the British Pharmacopœia from abietis oleum to zingiber. It is doubtful however if the ease of reference thus obtained is so important as to take precedence over the classification of drugs into groups with related properties; it leads to much repetition as, for example, by the separation of the crude drugs from their constituent alkaloids. The first quarter of the book is of a general character and is given up to descriptions of prescription writing, imcompatibilities, definitions, and a summary of the types of pharmacopœial preparations. The special part will no doubt prove useful in the revision of pharmacy and materia medica, but contains little about the pharmacological actions of drugs or their application in medicine. Thus the actions of adrenaline are dealt with in four lines and the uses of organic arsenicals receive scant attention. A few statements are of doubtful validity: what, for example, is the evidence that sodium iodide is less likely to cause iodism than the potassium salt or that digitalis is contra-indicated in aortic regurgitation? But the book intelligently used will serve for rapid revision and help the student to avoid the slavery to proprietary preparations.

Dissection and Study of the Sheep's Brain

By JAMES WILKIE, B.Sc., Department of Biology, Guy's Hospital Medical School. London: Humphrey Milford, Oxford University Press. 1937. Pp. 95. 6*s*.

ANYONE wishing to do so can obtain a sheep's brain, but very few who are not medical students have the chance of examining a human brain. Even for the medical student such opportunities are limited, and a preliminary acquaintance with the brain of the sheep, with the assistance of this book, would greatly enhance the value to any medical student of that one dissection of the human brain which is all that is ordinarily permitted him. For many of the difficulties which arise in the course of that dissection are due either to the reduction in size of man's rhinencephalon or to the development and recurvation of the temporal region of his neopallium. The more generalised brain of the sheep magnifies, as it were, the parts of the rhinencephalon, and the anterior and posterior parts of the piriform area are seen at a glance, while the continuity of the fascia dentata and hippocampus with the induseum griseum is not difficult to follow. The slighter degree of recurvation in the temporal horn of the sheep simplifies the demonstration of the fimbria-fornix system, the caudate nucleus, and the choroid fissure. A lucid description is given of the choroid fissure and its relations as they occur in the fully formed brain of the sheep (Figs. 14, 45, and 50), and this will be helpful to dissectors of the human brain, but the statement that these relations are due to secondary fusion between thalamus and striatum during development is not embryologically sound (p. 12). The directions for removing the sheep's brain from the skull are excellent.

Practitioners' Library of Medicine and Surgery

Supplement and Index. Supervising Editor, GEORGE BLUMER, M.A., M.D., David P. Smith Professor of Medicine, Yale University. London: D. Appleton-Century Co. 1938. Pp. 1161. £30 (in sets only).

THE twelve volumes of this library have suffered, as works of reference of their size must, from the rapid advance of medicine which makes revision necessary before publication is complete. The present volume, the last of the series, in addition to providing a general index, aims at bringing the entire work up to date by means of 73 supplementary essays by 67 American authorities. The articles are arranged roughly in the same sections as those in the previous volumes, so that they can easily be read in conjunction with them. The more important subjects dealt with here are the reticulo-endothelial system, hormones, and recent advances in therapeutics, and there is a comprehensive and practical section on the psychological aspects of pædiatric practice. More space is given to some of the rarities of medicine than their importance would seem to justify—for instance, there is an exhaustive twenty-page article on onchocerciasis—and there is a lack of reference to extra-American workers. The monographs of this encyclopædic work, however, undoubtedly advise the practitioner authoritatively upon any problem he is likely to encounter.

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[*See also pp.* 9, 14 & 18]

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THE LANCET

LONDON: SATURDAY, FEBRUARY 26, 1938

MEDICINE, EUGENICS, AND SOCIOLOGY

LAST week gave occasion for three pronouncements, each designed to stimulate, explain, or extend plans for national fitness. At the Guildhall on Thursday the KING spoke of the enhanced pleasure in work or play that physical well-being brings to young and old, and of his Government's intention to provide for people of all ages facilities for exercise and education of the body; and on the next day Lord STANHOPE, president of the Board of Education, and Lord ABERDARE, chairman of the National Fitness Council, addressing delegates from area committees, disposed in specific terms of the suggestion that there is any compulsive element in the schemes projected to this end. The emphasis on enjoyment rather than racial improvement as one of the main benefits to be expected from the campaign and on opportunity without regimentation as its motive is timely. Comment on the limits of improvement to be effected by physical culture in undernourished, ill-housed, or overworked communities, and in individuals of poor pedigree was made by the Galton lecturer on Feb. 16th and endorsed by the subsequent speakers at the dinner of the Eugenics Society over which Lord HORDER presided. Prof. J. A. RYLE computed that there must be many thousands in this country whom this and kindred hygienic movements will scarcely touch because defects, both inherited and acquired, of one type and another have put them beyond the scope of the most skilled remedial exercise or games. It was disappointing, he added, that so far in the campaign scarcely a word has been said about the importance to the community and the State of those foundations of health which only a healthy stock can furnish.

The constructive proposals embodied in the lecture (which will be published in full in the April issue of the *Eugenics Review*) deserve more than the casual attention often offered to after-dinner oratory. Prof. RYLE'S definition of the goal of medicine to-day is "the preservation of and the planning for the greatest possible health, happiness and efficiency for the greatest number by prophylactic measures, including eugenics and social reorganisation." This definition is the more notable in having been framed by one who describes himself justly as an active clinical physician concerned with diagnosis, the teaching of signs and symptoms, and the patching of individual lives. He recognises that "from most diseases in which recovery is possible recovery occurs spontaneously; some are only recoverable with the help of the doctor and the nurse; a few require the help of specific remedies or surgical intervention," and from this standpoint he argues that although only a limited number of diseases can in the strict sense be cured, health can be taught and the doctor of the future will far more than heretofore bring his benefits by instruction and precept. Actually the public is eager for instruction on matters biological and it is often the doctor who holds back, partly because he has not been trained to consider such advice as eugenic prognosis within his scope and thus has not equipped himself to give it, and partly out of a false sense of delicacy. Such problems as the size and spacing of families; the pros and cons of voluntary sterilisation of the unfit; taxation relief for encouragement of healthy parenthood; the significance of population fluctuations; the various causes of decline in physical standards; the origins of mental defect and so forth are not matters to which the average practising doctor, harassed by many calls on his time, has hitherto given much attention. Yet it is from doctors in personal contact with family lives that advice is apt to be sought and Prof. RYLE suggested that the general practitioner, now being gradually relieved by public clinics and extending hospital services of certain of his daily tasks, might well fit himself to serve the community in new ways. With recognition of these new functions the voluntary system of medical service would remain undisturbed; the coöperative principles would have free scope; and both the individual approach in the hospital or the consulting room and State-aided organisation could play their respective parts.

The stimulation of the interest of practising doctors in domestic eugenics was only one of the fertile suggestions made by Prof. RYLE. He visualised the formation of a national council embodying a triple alliance between medicine, eugenics, and sociology, to stand in the same relationship to the Government in the preventive field as the Medical Research Council stands in relation to the pursuit and application of medical research; the modification of the medical curriculum in order to emphasise all preventive aspects, especially the preservation of health by nutritional and other social reforms, and by application of genetic studies to eugenic education and legislation; and the establishment of research chairs or readerships in human genetics. His plea for the effective pooling, interpretation, and translation into action of the knowledge constantly being accumulated by medical workers was supported by Sir WALTER LANGDON-BROWN and Sir FARQUHAR BUZZARD, though the former hinted that the patient's predilection for the "curing doctor" was natural and would not soon be overcome. At Oxford the institution of a chair of human heredity would be welcomed by Sir FARQUHAR as a logical development of the ideal, underlying recent benefactions, of bringing the study of academic and applied science into proximity.

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HÆMOLYTIC ANÆMIAS

THOUGH they have proved a useful dumping-ground for obscure blood diseases the hæmolytic anæmias form a very unsatisfactory disease group. There has been no clear and accepted definition of what constitutes a hæmolytic anæmia, and even where undue hæmolysis has been proved, there has seldom been any evidence as to how it is brought about. Within the last few months, however, considerable advances have been made. RHOADS and MILLER[1] have demonstrated that certain substances, such as phenol and amidopyrine, when taken by mouth together with a good diet are harmless, but when given with a deficient diet cause a severe sudden anæmia which they presume is hæmolytic. Further, it has been found that in Addisonian pernicious anæmia, which, since the discovery of liver treatment, has been regarded as a deficiency dyshæmopoietic anæmia, there is an increased excretion of certain pigments,[2] which suggests excessive hæmolysis. Again it is possible that such hæmolysis depends on a deficiency of some principle in liver since it apparently ceases when liver is given.

In our present issue Dr. DACIE, Dr. ISRAËLS, and Dr. WILKINSON record important experiments that go some way to unravel the cause of hæmolysis in patients with paroxysmal nocturnal hæmoglobinuria of the Marchiafava type. They find that the serum of such patients contains a lysin which is effective at ordinary body temperature, thus differing from that found in cold hæmoglobinuria, but which is extremely sensitive to slight changes in hydrogen-ion concentration within physiological limits. They suggest that reduced pulmonary ventilation during the night leads to such a change in the *p*H of the serum in vivo, and this is the reason why hæmoglobin is found in the urine passed in the morning. A similar lysin was demonstrated in normal serum, which proved capable of lysing the patient's cells; but normal cells were unaffected either by the patient's serum or normal serum: so evidently the fundamental abnormality in this disease lies in the red cells rather than in the serum. Similar results have been obtained independently in the United States by HAM.[3] A preliminary report is also available of three cases of acute hæmolytic anæmia in which DAMESHEK and SCHWARTZ[4] were able to demonstrate hæmolysins in the serum which were apparently unaffected by either cold or *p*H. These lysins were effective against red cells of all groups, including group O; they were inactivated by incubation with normal serum before the addition of red cells. One of DAMESHEK and SCHWARTZ's cases appeared indistinguishable from acholuric family jaundice, and all of them made spectacular recoveries after splenectomy. Finally JOSEPHS[5] claims to have isolated both from human and pig's plasma a protein-free fat-free substance which reduces, if it does not completely inhibit, abnormal hæmolysis in certain hæmolytic anæmias. He thinks that such anæmias may be due to a lack of some substance normally present in plasma, the function of which is to maintain the normal equilibrium between blood production and destruction.

Admittedly it is at present impossible to make a coherent story out of the varied facts recorded here. It is, however, a real advance to be able to record facts, rather than to elaborate arm-chair hypotheses, about the ætiology of the hæmolytic anæmias. It is clear at least that the mechanisms by which they arise are extremely diverse; extrinsic factors such as *p*H and temperature have their part, together with intrinsic factors such as red-cell abnormalities, while deficiencies and toxins may also be important.

ENDEMIC TYPHUS

Two cases of typhus fever, of which one (in Bristol) is described on another page of our present issue and one (in Cork) in the January number of the *Irish Journal of Medical Science*, raise again the question of the reservoir that maintains this dread disease between its epidemics. The infection in the Bristol case may, it is true, have been imported from abroad and the arguments for its foreign origin are duly set out by Dr. ALLAN GRAY and his colleagues. But the Cork case seems to have been indigenous and to have appeared after eight years' absence of typhus from that city.

Extensive researches have been made of late, especially in Russia, in Poland, and among the Arab population in Tunisia, to fix responsibility for the persistence of the pathogenic rickettsia during periods when no trace of the actual human disease can be detected. Unlike enteric fever, which almost certainly depends entirely on the human chronic carrier for its continued existence, typhus has no such refuge; the rickettsias, present in abundance in the blood and tissues during the fever, disappear rapidly and completely as convalescence proceeds. The possibility of subclinical cases arising during the intervals between outbreaks has been suggested, and (as with measles, rubella, and mumps) this is a reasonable hypothesis. Yet all the observations are against it. Subclinical cases of typhus infection are not uncommon during epidemics and can be detected both by the development of serum reactions—Weil-Felix and direct rickettsia agglutination (Weigl's reaction)—and by the isolation of the virus from the blood. But in such cases the amount of virus in the blood is small and it disappears rapidly; lice fed on the patients with subclinical (as opposed to clinical) typhus seldom or never become infected. Furthermore during inter-epidemic times, even in a population subject to regular winter outbreaks, no subclinical case has ever been detected. Polish, Russian, and French observers are at one in denying to the subclinical human infection any rôle in the propa-

[1] Rhoads, C. P., *Proc. Soc. exp. Biol., N.Y.* 1937, **36**, 652; Rhoads and Miller, D. K., *Ibid*, p. 654; see *Lancet*, 1937, **2**, 1323.
[2] Dobriner, K., and Rhoads, *J. clin. Invest.* January, 1938, p. 95.
[3] Ham, T. H., *New Engl. J. Med.* 1937, **217**, 915.
[4] Dameshek, W., and Schwartz, S. O., *Ibid*, Jan. 13th, 1938, p. 75.
[5] Josephs, H. W., *Bull. Johns Hopk. Hosp.* January, 1938, pp. 25 and 53.

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gation or persistence of the disease. Nor is there reason to think that the virus is harboured in its lean years by the lice themselves. The life of an infected louse is usually less than a fortnight, though one observer (MOSING) notes survival in full infectivity for 45 days at 32° C.—a period which might well suffice to maintain a smouldering endemicity in poorly supervised communities. But there is no transmission from louse to louse and, though infection to a second generation through the egg has been alleged, the general opinion now is that this does not take place. The discovery of the rat rickettsia infections and their occasional transmission to man, producing mild forms of typhus fever (Brill's disease, Mexican typhus, ship typhus), has suggested that the rat may be the original reservoir, and that in favourable circumstances, such as frequent transmission to specially susceptible human subjects, the rat rickettsia may rise in virulence, become capable of infecting *Pediculus humanus* in natural conditions, and thus set up the cycle of the classical typhus. In Tunis, however, rat rickettsiosis is extremely common but typhus in epidemic form non-existent, whereas in the neighbouring country true typhus is always present but no rat typhus can be found. This speaks strongly against such a transformation, at least as a happening common enough to account for the rebirth of human typhus year after year.

One factor, to which both GIROUD and MOSING attach great importance, is the effect of fatigue, famine, and other diseases in lowering the resistance of the human subject and, more important, in raising the amount of virus circulating in the blood which facilitates louse infection. It is possible that the final extinction of typhus, as of tuberculosis and leprosy, may come through the world-wide amelioration of the conditions of human life. It is certain that as long as human agglomerations can be found semi-starved and huddled together, as in some regions of Asia, Africa, and South America, so long will the threat of invasion with typhus fever hang over the rest of humanity.

ANNOTATIONS

CHEMOTHERAPY IN CANCER OF MICE

IN *Science* for Feb. 11th Dr. L. C. Strong of Yale describes an important development in his work on spontaneous mammary carcinoma in mice. The feeding of these animals on a diet containing a few drops of oleum gaultheriæ, harmless to normal mice, had previously been found to provoke a hæmorrhage into the tumours followed by a connective tissue reaction and by a slowing of their rate of growth. This was not due to methyl salicylate, for the synthetic compound was without significant effect. Fractional distillation of the true oil revealed that the responsible agent was in a fraction, containing heptyl aldehyde, which distilled at a comparatively low temperature. This fraction caused a longer survival time in the mice and a definite slowing in the growth of the tumours, with softening, sometimes liquefaction, and in 4 out of 34 cases complete regression. The addition of heptyl aldehyde itself to an otherwise normal diet has given remarkable results. Of the tumours in the first 25 test animals, 6 showed complete regression, and liquefaction was so pronounced in the remainder that sterile fluid could be aspirated through a hypodermic needle. The fact that the drug is apparently harmless to normal animals points to a high degree of specificity in its action.

Dr. Strong wisely makes no sensational forecasts, but his claim that the investigation opens up the possibility that "spontaneous tumours, in mice at least, may eventually be controlled by chemotherapy" is justified. We understand that no symptoms accompany the complete regression of the earlier tumours, but naturally the liquefaction of large tumours may lead to ill effects from hæmorrhage or toxic absorption.

FEVER AND INSULIN RESISTANCE

IT has been generally recognised since the early days of insulin that bacterial infection may substantially increase the insulin requirement of a diabetic patient. The reason for this decrease in sensitivity to the action of insulin has been a source of speculation and inquiry for many years, but no satisfactory explanation has been reached. The investigations of Houssay [1] and others on the relationship of the anterior pituitary gland to carbohydrate metabolism have shown that this gland has an important rôle in the regulation of the sensitivity of the body to the hypoglycæmic action of insulin. In the absence of the anterior lobe this sensitivity increases; while on the other hand injection of a suitable anterior pituitary extract will induce a resistance to the action of insulin administered intravenously to normal animals. It seems possible, therefore, that the anterior pituitary lobe is concerned in producing the insulin resistance that follows bacterial infection and Wien [2] has pursued this suggestion. As the secretion of the pituitary gland has a profound influence on the thyroid gland and on the adrenals, the part that may be played by these glands was also examined. It was found that the pyrexia following subcutaneous administration to cats, rabbits, and rats, of a killed culture of *Bacillus coli communis*, did not cause a rise of blood-sugar, but almost abolished the hypoglycæmic response to the subcutaneous injection of 0·5 unit of insulin per kg. of body-weight. In hypophysectomised rats, and in thyroidectomised or adrenalectomised rats and cats, the bacterial pyrexia was somewhat diminished in intensity, and had little effect on the insulin sensitivity. In rabbits, on the other hand, the bacterial pyrexia was little altered by removal of the thyroid or adrenal glands, and still diminished the response to injected insulin in the absence of these glands.

It seems probable from these results that the diminished rise of temperature caused by *B. coli* in cats and rats which lacked thyroid or adrenal glands is related to the failure of these animals to develop the insulin resistance which usually followed *B. coli* administration. The evidence suggests that the hypophysis, and the thyroid and adrenal glands, may all be concerned in the production of bacterial pyrexia and the resistance to the hypoglycæmic

[1] Houssay, B. A., *New Engl. J. Med.* 1936, 214, 971.
[2] Wien, R., *Quart. J. Pharm.* 1937, 10, 621.

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action of insulin which normally accompanies it. How these glands influence both bacterial pyrexia and insulin sensitivity is still far from clear.

A HYPOTHETICAL CASE

A CORRESPONDENT has invited an opinion on a case which, for the purpose of abstract discussion, may be propounded as hypothetical. A women's journal provides among other features a weekly service of advice on general health, the management of pregnancy, and birth control. Subscribers who fill in a coupon can enrol themselves as members of a Health Club. They are then entitled to put their questions to a registered medical practitioner who either answers them directly through the post or gives printed replies in the columns of the paper. The registered medical practitioner has written a book explaining fully what are described as the various medically approved methods of birth control. In answers to correspondents the applicants are referred to this book and are informed of the price and the publisher's name and address.

The hypothetical point on which opinion is invited is whether a registered medical practitioner, writing regularly in a weekly or other newspaper under an assumed pen-name, is allowed to advertise his or her book in which he or she has a commercial interest. The practice, it is suggested on the one side, is one which might be dangerously extended to all sort of popular fads apart from the somewhat controversial topic of birth control. On the other side it might be said that many practitioners publish books in the course of an honourable professional career and are entitled to whatever advertisement or profit may result. In the hypothetical case propounded above, it may be said, the medical journalist is placed in touch with otherwise unknown and inaccessible patients through the medium of the newspaper. They may be drawn away from their own medical attendant. But notices in the hypothetical newspaper make it clear that the medical journalist does not pretend or desire to deal by correspondence with the treatment or diagnosis of disease; on these subjects the applicant is advised to consult her own medical attendant. The hypothetical answers to correspondents, too, usually begin by recommending the inquirer to go to a sympathetic doctor or to attend a clinic. Still the journalist is in effect using the system of the Health Club to advertise the already published book. Is this conduct to be described as unprofessional? If hypothetical cases can arouse any interest, what do our readers think?

REGIONAL COLITIS

IN the absence of a strict ætiological classification of non-specific ulcerative colitis, it has been possible only to group cases of this kind according to the severity of the invasion and the resistance of the patient. A further division was offered by J. A. Bargen in 1932 when he drew attention to a right-sided localisation of the disease in some 10 per cent. of all cases of so-called non-specific ulcerative colitis. In nine cases out of ten the condition involves the rectum and lower sigmoid and tends to spread orally over the various segments until the whole mucosal surface of the large intestine may be involved. Bargen, however, reported 23 instances of right-sided regional colitis and Crohn and Berg[1] give their findings in 17 others. It appears that nearly all the patients are between 20 and 30 years of age, and males predominate among them. In its gross and microscopic features the disease resembles ulcerative colitis as ordinarily seen in the terminal segments of the colon: there is diffuse ulceration of the mucosa, suppuration in the submucosa, and thickening and induration of all the coats of the bowel; in the late stage there may be polypoid hyperplasia. The disease behaves as though it were an infection, beginning with fever and prostration, and spreading proximally and distally. The bacteriology of the fæces or of tissue cultures taken from specimens removed at operation throws no light on its nature; the usual dysenteric organisms and protozoal parasites are absent. During the active stage there is diarrhœa, but this is rarely very severe, and there is not the urgency, nor the passage of blood-stained mucus with tenesmus that is so common when the rectum is seriously affected. Cramps, abdominal pain, fever, loss of weight, anæmia, and a tender palpable mass in the lower right abdominal quadrant are found; and radiography after barium enema gives a diagnostic picture of colitis; but there is not the "string sign" so typical of regional or terminal ileitis. American authors find primary ileocæcal tuberculosis of the hyperplastic type so unusual that it does not appear to be a stumbling-block in diagnosis. From the experience of Crohn and Berg this form of ulcerative colitis is not amenable to ordinary medical methods of treatment; they have operated on 14 cases and propose to operate on 2 more of the 17 they report. The usual methods of cæcostomy, ileostomy, and other procedures that make an artificial anus have been unsuccessful. The method preferred begins with anastomosis of the transected terminal ileum into the lower sigmoid; the remainder of the bowel then has its proximal end closed and its distal end brought up to the surface temporarily, and at a later stage the excluded part of the colon is removed by two or more operations. Thus the continuity of the alimentary tract is maintained without a permanent stoma. Five patients thus treated have done well.

[1] Crohn, B. B., and Berg, A. A., *Amer. med. Ass.*, Jan. 1st, 1938, p. 32.

SUPERNORMAL PERCEPTION

PSYCHOLOGY has much to do in the study of individual differences, a field so little cultivated that there is still only a thin line dividing some of the unfamiliar extremes of human capacity from the mysterious and the miraculous. Synæsthesia in its more striking forms is almost as extraordinary to most people as second sight, the mathematical intuitions of an Euler or a Ramanujan scarcely less supernatural than magic. In remoteness from normal understanding there is little to choose between a prodigy—Mozart composing sonatas in his nursery or Koltanowski playing 34 games of chess blindfold—and, at a less credible level, a medium who levitates tables and reads thoughts. Mediums are not so rare as prodigies (though rather more expensive) and their apparent powers are well worth psychological study. Unfortunately a good deal of time has usually to be spent in demonstrating that they cannot work miracles. The University of London Council for Psychical Investigation has done much to bring "paranormal" manifestations into line with the known abilities of man, and a report[1] has just been published of an inquiry of this kind made under its auspices. In an excellently conducted and recorded series of experiments Mr. S. G. Soal has investigated

[1] Preliminary Studies of a Vaudeville Telepathist. By S. G. Soal, M.A., B.Sc. Bulletin III. London: University of London Council for Psychical Investigation. 1937. Pp. 96. 5s.

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the alleged telepathic powers of Josef Kraus, known on the stage as Marion, whose remarkable performances had attracted the attention of Bleuler (the Swiss psychiatrist) and other eminent men. The most significant of Marion's accomplishments were the finding of a hidden object, and the recognition of any card he had held in his hand. The former, which he could undoubtedly achieve without trickery or any physical contact with anybody in the room, turned out to be attributable to his—one is tempted to say, preternaturally—sharp observation of the footsteps of a person walking behind him (who is aware of where the object is), or, if all the audience is seated, of their involuntary head-movements and changes of facial expression. His skill in recognising cards was unknown to him until Mr. Soal tried it. Marion attributed it to a faculty of clairvoyance, but it could be accounted for, after Mr. Soal's experiments, by supposing his acuteness of touch and his general alertness to sensory stimuli to be exceptional. These findings go further than their negative aspect suggests; the experiments did not merely dispose of some claims to the power of clairvoyance and telepathy, but they indicated also how highly perception may be developed. It is customary now to pay respect to the great clinicians who could diagnose and prognose so well, with few of the aids we find indispensable. They could hardly have done so unless they had possessed some of the qualities demonstrated in this stage telepathist. Most doctors would certainly like to know how one can train one's powers of perception and of inference from barely perceptible data. Psychiatrists, in particular, often depend on their aptitude for using the patient's expressive movements as clues to his state of mind. Such observations as those made on Marion are physiologically and psychologically important, and deserve to be carried much further. Unfortunately it costs a lot of money to take up the time of a successful vaudeville artist, and it is seldom that one can be found as complaisant and coöperative as Marion was.

A REMEDY FOR A VIRUS DISEASE

Dochez and Slanetz[1] describe experiments designed to determine whether a chemical agent, sodium sulphanilyl sulphanilate, will cure dog distemper. Their subjects were ferrets injected subcutaneously with nasal washings taken from dogs in the acute stages of the disease. In one experiment when the washings were unfiltered the control animal died in 12 days with typical symptoms of distemper, whereas the other ferret which received 0·5 gramme of the drug twice daily from the 5th to the 18th day showed no symptoms and survived until the 43rd day. In the other experiment, when the washings were filtered free from bacterial contamination, the control died on the 25th day with typical symptoms and a treated animal, receiving 0·5 g. twice daily from the 10th to the 26th day, showed no symptoms and was alive 57 days later. In the latter case the treated ferret had begun to show symptoms with a temperature of 104° F. on the day when treatment began. Two further experiments were done with dried virus; in these the control ferrets showed typical symptoms with fever, while the treated animals had no symptoms after the drug was given. These observations are very few in number but the results are striking in that cures were obtained when treatment started comparatively late after infection. Dochez and Slanetz add that 28 cases of natural dog distemper have been treated with 1·0 g. of the drug twice daily and only 2 of the dogs have died; also that the drug is active against cat distemper, which has been shown to be due to a different virus.

The structure of the new drug is very like that of sulphanilamide, and it seems likely that its mode of action on the infecting agent is similar. Sodium sulphanilyl sulphanilate is, however, freely soluble in water and the data show that it is eliminated very quickly; a dog receiving 1·9 g. intravenously had 320 μg. per c.cm. in the blood after five minutes, 32 μg. after two hours, and none after twenty hours. If these figures are compared with those of Marshall and others[2] for the elimination of sulphanilamide in the dog, where there is very little fall in the level in the blood in the first two hours, it will be seen that the new drug is much more quickly excreted. This suggests that it diffuses more readily throughout the animal body; it is probable also that the infecting virus is inside the cells of the host and therefore it would be less easily reached by a chemotherapeutic agent than an infecting bacterium.

Rosenthal[3] has already reported the successful treatment of choriomeningitis virus infections in mice with Red Prontosil, but this observation has not yet been confirmed. Rosenthal failed to get an effect with any of the other sulphanilamide compounds; also influenza virus and encephalitis (St. Louis) virus infections were resistant to all treatment. Dochez and Slanetz's paper is the only other report of successful chemotherapy in a virus disease, and its importance lies in the fact that if these findings are correct other diseases due to virus infections may be found amenable to similar treatment.

CHILDREN'S TEETH

UNDOUBTEDLY there are several factors that can influence the structure of teeth and the incidence of caries. Those who have been impressed with the part played by one factor have usually seen instances of perfect dentition contravening their theory—the cleanest tooth has been known to decay. Prof. Talmage Read and Miss E. M. Knowles[4] therefore set about the study of caries not by watching the effect of varying one factor but by inquiring into as many variables as they thought relevant. They examined 2894 elementary school-children, classifying them according to the incidence of caries. They then recorded the diet, nurture, and habits of small groups of children selected for their good or poor teeth. The proportion of children with complete dentitions and freedom from caries was extremely small, ranging from 6 per cent. at the age of six to 0·6 per cent. at nine and 4 per cent. at thirteen. This latter rise was due to the loss of deciduous teeth. Read and Knowles found over 50 children remarkably free from caries but for convenience they selected 12 of these for special study, contrasting them with a similar group showing extensive disease. The healthy group ranged in age from five to fourteen. Their economic circumstances varied, but the careful and intelligent manner of upbringing was commented upon as a characteristic of the group even in the poorest child. Infant feeding appeared to be imperfect in only 1 case and this had been followed by imperfect structure of the permanent teeth; 7 had been breast-fed and the other 4 had received vitamin supplements to their bottle-feeding. The general

[1] Dochez, A. R., and Slanetz, C. A., *Science*, Feb. 11th, 1938.

[2] Marshall, E. K., Emerson, K., and Cutting, W. C., *J. Amer. med. Ass.* 1937, 108, 953.

[3] Rosenthal, S. M., Wooley, J. G., and Bauer, H., *Publ. Hlth Rep., Wash.* 1937, 52, 1211; see *Lancet*, 1937, 2, 810.

[4] *Brit. dent. J.* Feb. 15th, p. 185.

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diet was well balanced with adequate protein, fat, and green vegetables; all but 1 were given additional milk; every child had fresh fruit, particularly apples, daily, and 7 took fruit abundantly. Meals were regular, there was no eating between meals, and the children enjoyed chewing hard foods; cod-liver oil was taken by all but 3 in varying amounts, and the consumption of sweets and other fermentable carbohydrates was very limited. All the children were nose-breathers; only 2 had used the baby comforter, and all brushed their teeth, 8 of them several times daily.

The corresponding group of 12 children with extensive caries formed a striking contrast to the others. The ages ranged from three to fourteen and the economic circumstances, though on the whole not so good as of those in the other group, were not limited to the poorest class. The intelligent management of the diets and feeding of the children was not as evident as in the first group; infant feeding had been unsatisfactory in the large majority and the general diets were deficient in protein and fat; vegetables were decidedly lacking and the consumption of fresh fruit not so abundant as in the other group. All the children had had additional milk but only 6 had been given cod-liver oil even for varying periods. They had all had an abundance of sweets daily, as well as fermentable carbohydrates such as biscuits. A comforter had been used by 6 children—one for 5½ years—and in 5 with extensive caries of the deciduous teeth sugar had been applied to it. There were 6 mouth-breathers and the mouth hygiene was generally unsatisfactory, only 2 children using the toothbrush daily.

The possible influence of heredity was considered but the information obtained did not support this factor: children in the same family showed variations according to differences in their diet and habits.

USE OF NITROUS OXIDE BY MIDWIVES

MANY midwives and pupil midwives are now having instruction in the induction of gas-and-air analgesia during childbirth. This is the natural and desired corollary to the action of the Central Midwives Board after their inquiry conducted with the aid of the British College of Obstetricians and Gynæcologists. It is too soon yet to assess the advantages that may be reaped from putting nitrous oxide into the midwife's hands, and it is far too soon to discern any influence this might have on the birth-rate. The sceptic may add that it is also too soon to estimate the dangers that have been created by turning the midwife into a "kind of anæsthetist." These dangers should be reduced to a minimum by the machines put at their disposal. It would need a good deal of carelessness, stupidity, or wilful misuse to bring a patient into danger by means of the Minnitt machine or the Queen Charlotte's gas-air apparatus. These two are at the moment, we believe, the chief if not the sole occupants of the field. It is interesting to hear that one of the former kind was used at the recent royal confinement in Holland, and that a large number of British gas-and-air machines are being bought abroad. The chance of these machines falling into disfavour does not lie, we think, so much in any risk involved in their use as in their occasional inadequacy. A proportion of women are not susceptible to the comparatively feeble aid which is all that such "safety machines" can supply. The conscientious midwife unable to fortify an insufficient anæsthetic may become impatient with the machinery that provides it. But this would be a pity, for the machines show that much trouble and ingenuity have been expended in making them as simple, as portable, and as effective as possible within the limits prescribed by safety. Weighing only 18 lb., complete with cylinder, such an apparatus can readily be carried on a bicycle over the back wheel. The British Oxygen Company have issued a pamphlet that illustrates attractively the essential points in their equipment as well as giving a just appreciation of its powers and hints how best to call them forth. The lively discussion about the relative merits of short inhalations of undiluted gas, and prolonged inhalation of gas-and-air, which is being conducted by Prof. Chassar Moir and Dr. R. J. Minnitt in the *British Journal of Anæsthesia*, does not affect the questions we have alluded to, for administration of the pure gas is not recommended to or available for the midwife.

THE DECLINE IN THE POPULATION

IT was perhaps inevitable that last week's discussion by the section of obstetrics and gynæcology of the Royal Society of Medicine should have drifted away from the purely medical aspects of population towards the more interesting—because more arguable—social and economic aspects. The proposition that children can be secured merely by paying women to have them, or (what amounts to the same thing) by penalising childless couples financially, came in for some rough handling. In the first place, the success of this policy abroad may perhaps be temporary, and is by no means yet established; in Germany, for instance, the large previous decline in first and second births has been made good, but the regular production of the third child has still to be accomplished. Secondly, relative economic prosperity seems to lead to fewer rather than more births. One speaker was told in New York in the boom period of 1926 that "contraceptives are being used now by everyone except Catholics and lunatics"; another speaker had ingeniously ascertained from "Who's Who" the number of children born to one hundred persons, married for at least twenty years, each of whom had left more than £100,000, and had found that the average was only 2·3, although presumably all economic restraint had been removed and a third of these persons had the additional incentive of a hereditary title to transmit. Again it is certain that in a working-class community an extra child is—or perhaps was—looked upon as an extra insurance against old age which more than balances the extra mouth to be fed in childhood. As Prof. A. M. Carr-Saunders rightly emphasised, the decline in the population is due to many and complex causes and therefore the remedy—if one is to be sought—cannot be simple. There may be a decline in the capacity for child-bearing, a cycle of infertility; there may be a decrease in intercourse, both within and without the marriage tie; conception may be prevented; or finally the result of conception may not be a birth.

The medical causes of failure to conceive were dealt with by Mr. Eardley Holland, and his paper showed what a change has come over the attitude of British gynæcologists towards sterility. Less than ten years ago a round of London gynæcologists by a childless married woman resulted in dilatation and curettage with tubular inflation, after which no one had much to offer except hope. The husband was seldom examined. Yet now Mr. Eardley Holland was talking of multiple and complex fertility factors and saying that in both the male and the female constitutional factors are more important than local and

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that in 40 per cent. of sterile unions the semen shows obvious defect. He suggested that any delay in the onset of menstruation should be treated by gonadotropic pituitary hormone to prevent genital hypoplasia and subsequent sterility. Prof. J. C. Drummond, speaking as a biochemist, suggested that the fall in fertility might be due to a shortage of vitamins B_1 and E in the national diet, due to the consumption of white bread. Although this theory evoked criticism, the general impression left by this part of the discussion was that it should now or very soon be possible, by means of the newer hormone and vitamin therapy, to prevent a large proportion of involuntary sterility. Dr. R. R. Kuczynski emphasised our statistical ignorance of the problem. We had no knowledge whatever of the proportion of wives marrying under the age of thirty in England who remain childless. Nor would the position be very much better when the first statistics resulting from the new Population (Statistics) Bill came to hand. These new statistics would tell us a great deal about the births that occur but very little about the births that do not occur. It seems clear that, whether or not we believe that the decline in the population is a disaster, there are two main tasks for the medical profession to perform: first, the enlightenment of public opinion, to allow of statistical and other research so that the true position may be known; and secondly, the successful treatment of sterility and early abortion so as to eliminate the involuntarily childless marriage. On the larger issue, a fall in fertility seems to be a phenomenon of civilisation. Childbirth is a primitive function and with the life-saving knowledge that comes with civilisation, may there not also come a loss of the fertility no longer needed to compensate for the heavier wastage of uncivilised communities?

THE MANAGEMENT OF DIABETIC OUT-PATIENTS

THE increasing incidence of diabetes was the subject of comment at a meeting of the London and Home Counties branch of the Medical Superintendents' Society held at County Hall, Westminster, on Jan. 20th. Dr. H. P. Himsworth quoted from the registrar-general's reports for 1936 figures to show that deaths from diabetes were as numerous as those from all infectious diseases put together and were rising steadily. At his own clinic at University College Hospital, Dr. Himsworth said, the diabetic patients were increasing at the rate of about 200 new patients a year; the admissions last year were 65, out of a total of 900 attending for this disease; 100 more patients were scattered in other departments of the hospital, with a 50 per cent. admission-rate. The organisation of an efficient clinic under one head to secure continuity of treatment involved the coöperation of a dietitian prepared to give simple explanations and to take the financial position of each patient into account; a chiropodist to supervise the care of the skin and to advise on footwear, in order to prevent gangrene; a radiologist to make annual examinations of the chest, since the prognosis of pulmonary tuberculosis was at least as good as in non-diabetics if the diagnosis was made early; and a technician for urine analyses. Dr. Himsworth saw no need for casual blood-sugar estimations, but regarded glucose-tolerance curves as often essential for diagnosis. He placed great reliance on the ferric chloride test for acetone bodies. Whereas the nitroprusside test (positive at about 1 : 400,000) is very sensitive, a positive ferric chloride test is found at concentration of about 1 : 1500 and provides a most useful warning of imminent coma and indication for immediate admission; if the patient is able to swallow he is given glucose 50 g. and 25 units of insulin every three hours until the urine is clear of acetone bodies. About 100 patients, including about 6 new cases, can be dealt with in one session. The coöperation of district nursing associations is of great importance. Patients are weighed at first daily, later weekly. Treatment is by diet alone for the first week if there is not much acetonuria, and later insulin is started if acetone is present. Dr. B. A. Young spoke of the effect on prognosis of the financial position and intelligence of the patient, and of the skill of his medical attendant. Continuity of treatment was an important factor and the cultivation of good relations between the clinics and practitioners and district medical officers was of great benefit to the patients. The cheapness of high carbohydrate diets compared with high fat or protein diets was worth noting in planning the treatment of patients in poor localities. The initiation of definite schemes by large municipal authorities and the widespread organisation of centralised clinics would do much to encourage continuity and standardisation of diabetic treatment.

TESTOSTERONE IN THE TREATMENT OF PAINFUL BREAST

THE use of œstrone in the treatment of mastodynia and cystic disease of the breast was considered in a leading article in our issue of Feb. 5th when certain hypothetical drawbacks to its administration were mentioned. We then referred to the possible advantages of employing testosterone for the same purpose, and it may be of interest to review one or two reports that have already appeared on its application in practice. Desmarest and Capitain [1] gave testosterone acetate by intramuscular injections. The first dose, they think, should be administered about two days before the pain is expected, and repeated at two-day intervals up to six injections. Their doses range from 5 to 10 mg., the latter being the maximum. They avoid giving testosterone during the ten days following menstruation and two days before its onset. Turpault,[2] from an experience of 53 cases, recommends the treatment of mastodynia with testosterone propionate in doses of 10–30 mg., except in young girls who, he finds, are often very sensitive to testosterone; for these he prefers a dose of 1 or 2 mg. The injections are made on each of the three days preceding the expected onset of pain. Turpault classifies cases of mastodynia into three categories:

(i) Symptoms appear between 12th and 8th day preceding the menses and are caused by excess of œstrone.

(ii) The symptoms come on from the 8th to the 3rd day before the menses, and are perhaps due either to an excess of progesterone or a deficiency of œstrone.

(iii) The pain sets in on the 3rd, 2nd, or 1st day before menstruation and is the consequence (Turpault suggests) of a fresh output of œstrone under the renewed activity of the pituitary, the corpus luteum having ceased to exert its inhibition.

Testosterone, he finds, almost always gives good results in cases belonging to groups (i) and (iii), but in those of group (ii) it fails to cure and often aggravates the symptoms. Bender [3] has treated 12 cases of mastodynia with testosterone propionate. In 4 of these he obtained complete relief, and in 6 considerable alleviation, while 2 were failures. Both of these failures fall into group (ii) of Turpault's classification, the onset of pain having been 8–9 days before the menses in one patient, and 12–15 days after the

[1] Desmarest, E., and Capitain, Mme., *Pr. méd.* 1937, **45**, 777 and 1109.
[2] Turpault, M., *C.R. Soc. franç. Gynéc.* 1937, **7**, 181.
[3] Bender, X., *Ibid*, p. 222.

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preceding period in the other. Two of his successful cases had been treated previously with œstrone benzoate with relief of symptoms at first but recurrence later. Dr. A. Loeser, in our issue of Feb. 12th, has also reported favourably on the use of testosterone propionate. His two cases appear to have been more advanced and he used larger doses than the other clinicians we have quoted. It is interesting to note his observation that 180 mg. given in the course of six weeks inhibited menstruation which was resumed after the injections were withheld.

New forms of treatment often are extolled beyond their merits, and a much larger experience of testosterone as a remedy for mastodynia must be awaited before its value can be estimated. Meanwhile one definite contra-indication to its use may be mentioned —namely, pregnancy. Experiments have shown that the administration of testosterone to pregnant animals is apt to cause delayed parturition, death of the fœtus, difficulty in suckling, and certain embryological deformities; the free-martin is an example of this sort of action. Even though the doses used in human therapeutics may be thought far too small to cause any such untoward consequences, there is no certainty about this; it would be an unhappy position for everyone concerned if injection of testosterone during pregnancy were followed, whether through pure chance or not, by any of the mishaps mentioned. Apart from pregnancy, and with the precautions already mentioned, there seems to be no particular contra-indication to the use of testosterone for the treatment of cases of mastodynia.

BLOOD-GROUP EVIDENCE

THE characters that determine the human blood groups are inherited as Mendelian dominants, and therefore a child cannot have a blood character not possessed by one of the parents. By the use of tests for the A and B, M and N characters of the mother, the child, and the alleged father, it is possible definitely to exclude paternity in about one-third of the cases where the man is not the real father. The scientific basis for the rules of inheritance is now unassailable; that underlying the result of any particular test is nearly so if the pathologist is competent and experienced. The judicial use of the tests has been delayed in this country for want of special legislation, but in Germany it has been practised on a large scale for many years. Prof. G. Schrader[1] expresses the interesting opinion that the characters A_1 and A_2 can now be differentiated so precisely that evidence can be based on their detection. The difference lies in the strength of the receptors holding the antibodies in the corpuscles: in the A_1 group they are strong and in the A_2 weak. He is satisfied that these characters are fully autonomous and not merely subgroups, also that there are no gradations between them. The technique of differentiating between them by capillary absorption has now been crystallised on practical lines. It is not, however, quite to be trusted until the child is six months old and the receptors have reached their full strength. The legal significance of this advance is that if the child's group is A_1 and the mother's is A_2, the father's cannot be A_2 or O, and if the mother's is O his cannot be A_2. The evidence for distinct B_1 and B_2 factors is not forthcoming, but there seems to be an N_2 in a few rare cases in conjunction with M, as N_2M. Evidence based on either of these weak factors must of course be independently checked. The possibility that they may be missed does not compromise an exclusion of paternity based on the existence of other factors, but only means that if they are missed a man is not excluded who might have been excluded if they had been found. Prof. Schrader also points to the need for strict rules governing the identification of samples and the checking of results. If Parliament is to be asked to give magistrates discretion to make submission to the test a condition of hearing an application for an affiliation order, the scientific authorities must be ready with convincing proof that their contribution is thoroughly reliable. The German courts now repose great confidence in the experts, so much so that Prof. Schrader cites a case in which a girl was sentenced to a year's imprisonment for perjury on a blood-group exclusion alone, although she was a convincing witness, the man was an unconvincing one, and she brought a number of witnesses to support her case. The verdict was confirmed by her confession that she had chosen the man as being more likely than the real father to be able to pay.

[1] *Med. Klin.* Feb. 4th, p. 141.

A SUBSTITUTE FOR ŒSTRONE?

SOME do not want to hear about mysteries till they are solved. Others hang on the detective's lightest word, or rush to read the novelist's latest instalment. Those in the latter group at least should find pleasure in a remarkable investigation whose progress is being recorded from time to time by Prof. E. C. Dodds and his associates in the columns of *Nature*. The object pursued is a synthetic œstrogenic hormone that can be used instead of œstrone itself and can be obtained more readily. The first surprise was encountered when it was discovered that substances having almost no structural relationship to œstrone were to some extent œstrogenic.[1] It later proved that derivatives of stilbene were remarkably active, though the quantities required remained in the region of milligrammes rather than microgrammes. A solution seemed to have been found when the investigators tried *p*-hydroxy-propenyl benzene or anol. They reported its œstrogenic activity as 1 μg.[2] and this was confirmed by a few workers abroad. Others however declared the substance to be wholly inactive and implied that a mistake had been made. Reinvestigation showed that the activity was always present in the mother liquor and it was concluded that the activity was probably always due to a polymer of anol which had adsorbed on the anol itself.[3] At this stage in the inquiry the Middlesex Hospital workers joined forces with Prof. R. Robinson, F.R.S., of Oxford, and the latest instalment of the serial[4] records joint work in the two laboratories. The most potent substance so far found is the 4 : 4′-hydroxy-diphenyl-α : β diethyl stilbene, which has an activity three times that of œstrone. The two formulæ published are striking in showing the high activity of the stilbene compound and the relatively low activity of the chrysene compound in which the two middle rings are closed. The question directly arises whether the new product can replace œstrone in clinical practice. Of far greater potential importance however is the demonstration that a substance chemically very different from œstrone has even greater œstrogenic activity.

ON March 3rd, 8th, 10th, at 5 P.M., Dr. C. C. UNGLEY will deliver the Goulstonian lectures to the Royal College of Physicians of London. He will speak on some deficiencies of nutrition and their relation to disease.

[1] Dodds, E. C., and Lawson, W., *Nature*, 1936, 137, 996; Cook, J. W., Dodds, and Lawson, *Proc. roy. Soc.* B, 1936, 121, 133.
[2] Dodds and Lawson, *Nature*, 1937, 139, 629.
[3] Dodds and Lawson, *Ibid*, p. 1068.
[4] Dodds, Golberg, L., Lawson, and Robinson, R., *Ibid*, Feb. 5th, 1938, p. 247.

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SPECIAL ARTICLES

SOME ASPECTS OF WORKMEN'S COMPENSATION

THE departmental committee "on certain questions arising under the Workmen's Compensation Acts" have issued a report[1] divided into three separate parts dealing with different problems. The first part concerns

Miners' Nystagmus

The present position in relation to this disorder is regarded by the committee as unjust to both employer and disabled miner. It is held to impose an unnecessary burden on industry, to cause a lack of uniformity in the treatment of sufferers, and by promoting anxiety on their part to increase and prolong disablement. The committee's recommendations include the limitation of certification to those men in whom oscillations of the eyeballs are actually present, and persist for 15 seconds when tested in the dark after stooping exercises. The policy of excluding from employment underground men who have ever suffered from nystagmus is regarded as unjustifiable, and the committee welcome the changed attitude of employers in this respect, quoting with approval the agreement reached in the South and West Yorkshire districts. They recommend that employers in all districts should be urged to take back men who are certified or agreed to be fit for work and that in the event of refusal some form of official intervention should be undertaken. As to the medical machinery for dealing with cases, the committee contemplate that the certifying surgeon shall continue to act, but that the powers and duties heretofore exercised by the medical referee and additional powers and duties shall be vested in medical boards consisting normally of an ophthalmologist and a physician to be set up in various centres under the Home Office. The cost of such boards should be borne by the industry with a contribution from the Exchequer. It is recommended that the Home Office should compile a panel of medical practitioners appropriately qualified and willing to serve on medical boards in the various areas. The objects and duties of the proposed medical boards—which include ascertainment, supervision, instruction, and reassurance of affected workmen, and recommendations for their future—are defined. The medical board should have a discretionary power to declare unsuitable for further employment at the coal-face any miner under 30 who becomes disabled by miners' nystagmus. In order to secure as much uniformity as possible in practice in dealing with men who may be regarded alternatively as (1) recovered or (2) susceptible to further attack the committee recommend that liability shall continue to attach to the original employer for a specified period of years (either two or three). They also recommend that insurance against all liability arising out of miners' nystagmus should be compulsory.

Finally, they emphasise the fact that miners' nystagmus is an industrial disease which possesses features of a peculiar and distinctive character and that the exceptional arrangements suggested are not to be regarded as a precedent.

[1] Report by the Departmental Committee on certain questions arising under the Workmen's Compensation Acts. H.M. Stationery Office. 1938. Pp. 115. Cmd. No. 5627. 2s. The medical members of the committee were Dr. J. C. Bridge and Mr. John Gilmour.

AN UNSOLVED DILEMMA

On the whole the recommendations appear to us excellent, especially the emphasis placed upon the need for speedy re-employment of the nystagmic miner, for he is often disabled only for work down the pit and should not be allowed to suffer deterioration by idleness—a fate that in the past often befell men who were anxious to maintain their self-respect as members of a working community. It is on the question of diagnosis that the committee have come up against a serious difficulty, which they explain by quoting the following extracts from the third report, issued in 1932, of the committee of the Medical Research Council.

"A high percentage of the men (at some mines 34 per cent.) were found to have oscillation of the eyeballs but to be working efficiently without complaint, while on the other hand the absence of this symptom in the presence of symptoms of a nervous or psychological kind was not sufficient proof of fitness for work. The criterion of incapacity is not easily determined." . . . "The large number of compensation cases was due chiefly to psychological conditions. The situation should be handled on the medical side by emphasising the analogy between this condition and the condition once known as 'shell shock' and by combating the belief that the psychoneurotic symptoms can be a direct physical result of oscillation of the eyeballs; . . ."

These views plainly mark a new approach to the disorder and, though offering no easy solution to the difficulties of diagnosis, give an indication of how these have arisen. The psychoneurotic symptoms are an important factor in the disability, and the degree or even the presence of oscillation is no measure of their severity. Yet attention has been hitherto concentrated upon the oscillation, its disappearance being often heralded as a sign of recovery whilst the psychoneurotic symptoms—except those directly ocular—are ignored. The departmental committee note (p. 10) that the percentage of men with oscillation varies in different pits from about 5 per cent. to upwards of 34 per cent., whilst the fresh cases of compensation in any one year have never exceeded 0·45 and have been as low as 0·25 per cent. An ingenious explanation is offered that men become disabled because they are not able to acquire the capacity of correctly interpreting the apparently moving image; but that only shifts farther back the answer to the obvious and important question why only such a small percentage of men with oscillations should suffer from symptoms. On p. 19 is a statement, undoubtedly true, that there have been placed on the compensation list cases of psychoneurosis wholly unrelated to miners' nystagmus. But there is another aspect of the same problem: if one of the many men with oscillation develops a psychoneurosis, who shall say whether it is or is not related to miners' nystagmus? It may be that our fundamental conceptions as to the nature of the disorder call for revision.

In spite of the warning given by the committee of the Medical Research Council against the belief that the psychoneurotic symptoms can be a direct physical result of oscillation of the eyeballs—a warning in accord with modern teaching—we read (p. 27) that:

". . . the disorder begins to be disabling when the nervous system becomes affected by the oscillations. This means that the evidence of disablement lies

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in subjective phenomena rather than in objective; and the question of the reality and severity of the subjective phenomena may often depend to a large extent on the patient's statement."

The precise meaning of the term "nervous system" as here used is doubtful, but the paragraph seems to refer to psychoneurotic symptoms and follows immediately upon the recommendation, noted above, that a case may properly be certified if, when tested in the dark after stooping exercises, oscillations are found to persist for at least 15 seconds.

The committee have thus failed to find a means of escape from the old dilemma. If certification is based upon the presence of oscillation it is nevertheless necessary to examine the man on an entirely different principle to ascertain whether he is disabled; he may be equally disabled by psychoneurotic symptoms, but in the absence of oscillation he is not suffering from miners' nystagmus but from some other disease. The dilemma is not of our creation; it is an inheritance from the days when the recognition and diagnosis of psychoneurotic states were not matters of clinical interest, and the escape from it is not clear. To approach each case from the psychological side is not practicable at present, and to grant compensation in cases of psychoneurosis, with or without oscillation, without adequate examination and handling—which is what we have been doing—is not fair to the employer, the workman, or to the community. What is really the connexion between oscillation and psychoneurosis, whether a man suffers disability because he is psychoneurotic or whether it is possible for disability to occur without a psychoneurosis, are only some of the questions that call for answers, and to obtain them it is plain that the old conceptions need a more drastic revision than they have yet received.

General Medical Procedure under Workmen's Compensation Acts

The second part of the report deals with the committee's inquiries into the system of medical examination and certification by the medical referees and certifying surgeons in force under the Workmen's Compensation Acts, and into procedure and arrangements for ascertaining and supervising the physical condition of the injured workman. The recommendations made are that (1) the existing machinery must be amplified and strengthened, (2) there must be a right of appeal against the decision of medical referees, (3) the medical issues should where possible be settled by medical machinery and should not be the subject of litigation. At present any difference of opinion between the advisers of the workman and those of his employer may be referred to the medical referee for decision or may go to arbitration. It is suggested that in future all differences of opinion should be referred to the medical referee, with a right of appeal from his decision to a medical tribunal of appeal composed of three practitioners including one specialist; this tribunal would conduct a medical examination in private, and its decision as to fitness for work would be final. Witnesses as to fact but no medical witnesses would be called before this tribunal and this is a recommendation which may not be generally acceptable. In the present procedure in the county court medical witnesses on both sides are subject to examination and cross-examination by counsel who, in the London area at any rate, are generally specialists in Workmen's Compensation. It is usual to call evidence as to the work required to be done by the workman and then to confront the medical witnesses with this evidence; and it is often found that a medical witness is unable to sustain a previously expressed opinion that the man is fit to return to his work when he hears a description of the work. If the recommendations made in this part of the report are to be an unqualified success there is a definite need for more medical education upon the subject of estimating capacity for work. Probably more than 90 per cent. of medical practitioners are called upon periodically for certificates of fitness for work. The sort of question that they should be taught to answer is one that does not appear in examination papers on forensic medicine, though it is much more relevant to the doctor's future work than many of the questions he has to answer. For example: "A man aged 24 met with an accident on Jan. 2nd, 1938, and sustained a Colles fracture of the right wrist. You examine him for the first time on Feb. 19th. How would you determine his fitness or otherwise to do his work (*a*) as a wood-working machinist, (*b*) as a window cleaner, (*c*) as a professional Association football player?" The doctor of the future should learn the answers to such questions.

Lump-Sum Settlement

The committee note, in the third part of their report, that lump-sum settlement by agreement is generally popular with workmen, employers, and insurers, and recommended therefore that this principle should be maintained.

The evidence quoted in its favour appears to be a matter of opinion. Witnesses seemed to take the view that the condition of patients, particularly of neurasthenics, improved after a lump-sum settlement of their claim, although those witnesses who represented the Ministry of Pensions dissented from this view. Most of the witnesses knew of workmen who had lost or squandered their money, "but they were generally of opinion that such cases were relatively few and tending to become fewer," and the committee conclude that the proportion of these to the cases of lump-sum settlement is small. This conclusion is astonishing in view of the facts and figures available, which are at variance with the findings of the committee. Most of the States of America have investigated the subject and figures given in the report issued by the rehabilitation division of the New York City Education Department in 1936 support the evidence given by witnesses from the Ministry of Pensions rather than the conclusions drawn by the committee. These figures concern 322 men whose claims had been settled by lump-sum payments of £200 or more, and who were followed up for a period of three years. There is no indication that the results of this or any similar study were before the departmental committee and it is possible that their conclusions are based on insufficient evidence. In any case some distinction in their report might have been made between "settlement" and "lump-sum settlement." The settlement of a claim can be effected by awarding a sum of money to be paid out by the court in weekly payments. If it is made clear to the workman that this money will be paid to him until it is exhausted, whether he is at work or not, all the therapeutic benefits of settlement are obtained without the overwhelming disadvantage of handing over a large sum of money to a workman who is mostly unfitted by education, training, and environment to handle it.

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GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A HOSPITAL PHYSICIAN

IV

THE care of the aged is often so unsatisfactory that the old horror of "the workhouse" is still evident. No doubt it is largely due to the natural aversion of an old person from a change of life that is likely to be final, but I feel sure that it could be mitigated by a little regard for the conditions under which the aged are nursed in public institutions. A particularly unpleasant parsimony is to confiscate the whole of the old-age pension, often leaving a friendless old man or woman dependent on private charity for even a penny postage stamp.

A serious effort has recently been made by some councils—notably in Middlesex and Cheshire by the conversion of country mansions, and in Manchester by the provision of flats—to improve the care of the aged and infirm; but for the most part the only alternative to a bleak infirmary ward lies in the almshouses provided by charity, which serve only a very small minority. "Independent" working women are peculiarly handicapped by illness, in a way that is occasionally regarded very callously by public assistance authorities. Unable to pay rent out of their resources while in hospital, they are sometimes "sold up" if the illness is likely to last more than a few weeks. When, as is often the case, their livelihood is the keeping of lodgers, this may spell for them a permanent "workhouse life"; for when they are fit to leave hospital their capital (furniture and goodwill) is gone.

* * *

The public mental hospitals are in no better position than the general, but rather the reverse as regards staffing and overcrowding. One institution in the Midlands invited applications for appointment as medical officer in 1936, advertising itself as having 1800 beds "set apart for the reception of all classes of mental and nervous disorder" with an admission-rate of 1500 a year, and an existing staff of 4 doctors! This is an extreme but not an isolated example. When 90 per cent. of mental disorders are treated in public institutions which are understaffed to this extent, it is scarcely surprising that research in mental disease lags behind other branches of medical research, and that treatment is almost entirely empirical.

Incidentally it seems to me that neither the medical profession as a whole nor public authority deals fairly with the parents of mentally defective children. Many doctors withhold the diagnosis (either from cowardice or from a mistaken idea that to defer the information will cause parents less distress) until affections are deeply involved. Experts with much experience are agreed that mentally defective children are happiest in the company of other defectives, but doctors rarely give positive advice to parents to send their children to institutions, and in the absence of advice few parents have the courage to act on their own initiative. In place of this course, which is the only proper solution, much advice of an unthinking kind is distributed about "forming habits" and the like, and hopeless efforts are made to turn an imbecile into a scholar. With complete disregard of the suffering of parents, "interesting cases" are sometimes kept on the books of an out-patient clinic in order that the director may have the opportunity of displaying some characteristic syndrome to students from time to time.

Institutional facilities are themselves, however, often lacking. After school age is reached the education authority will assume some responsibility—but how often this relief to parents and teachers is delayed! For children under five there is scarcely any provision, and if some doctor or nurse takes unusual pains over a working-class child, and secures his admission to one of the general infirmaries of the public assistance or public health authority, he will often be "discharged" after a few weeks by an official who is either hardened by common usage or forced by lack of accommodation. The child is sent back to his unfortunate and defenceless mother, who is thus made to remind herself daily of the tragedy and to occupy herself with the heavy labour of his care, to the neglect of her normal children. This aggravation of unavoidable distress the middle-class family never suffers except as a masochistic self-infliction.

* * *

An outstanding defect in hospital administration—inexcusable in the municipal services, and only very partially to be condoned in the voluntary—is lack of coördination. The London County Council, with over 40,000 beds under its control, in upwards of 50 different hospitals, has made some progress in this direction and the Voluntary Hospitals Committee in London has now put forward a proposal for a sort of clearing house for emergency cases. But in most cities there is no regular coöperation whatever, no central office which can act as a bureau of information, allot cases and easily transfer them, and no common meeting-ground for administrative officers and technical staffs. The records of a person who has attended one hospital (whose case has perhaps been investigated at the cost of much thought and expenditure of energy and money) are *never* available for use at another: at the best, an abstract is prepared if the doctor in charge of the patient at the second hospital is sufficiently inquisitive and if the registrar or clerk at the first has a filing system capable of producing the records. Each institution is regarded as a separate unit, fighting its own battles—often against its neighbours!

A patient, or a mother with a sick child, may visit two or three different hospitals in widely separate parts of the city before gaining admission, and be only grudgingly received in the end by an already overcrowded institution whose staff consider that the case rightly belongs elsewhere. One could multiply ad infinitum the minor disabilities that present hospital administration inflicts upon patients—the hours frittered away, often at the cost of a day's wage, in waiting-rooms, the failure to notify relatives that wards are closed to visitors, the complacent ignorance which assumes that they are able to pay for several miles of transport, the unnecessary exposure to infection, the lack of privacy and injury to self-respect which custom allows. These things would mostly be changed if those in authority had the imagination to place themselves in the position of those for whose discomforts they are responsible.

* * *

Hospital administration cannot be static. Every increase of medical knowledge, every advance in

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social science, necessitates adjustment, and present standards of administration lag far behind the level accepted by medical opinion as implementing the results of research—behind even the opinion of the uninstructed, who do not require special knowledge to realise the imperfections. Such opinion, however, is rarely vocal. Patients and their friends, preoccupied with the fear of death or disablement, are inclined to be lenient: for them, hospital service is merely the best obtainable in their time of need, and deficiencies are forgotten in gratitude to the individual doctors and nurses upon whose efforts recovery depends. A protest, under such circumstances, against even glaring inadequacies, requires a rare independence of character, especially when the protest has to be made firstly to individuals who are seldom to blame and who tend to regard it as criticism of their own behaviour.

Pneumonia is an infectious disease, legally notifiable; yet patients with pneumonia lie in beds 2 ft. removed from others in wards containing up to 30 cases of all descriptions. At the season when pneumonia is particularly rife and therefore particularly infectious, the wards are often filled beyond their normal capacity by the erection of extra beds. Cross-infection is by no means unknown and pneumonia has a death-rate of anything from 20 to 50 per cent. Gastro-enteritis in infancy is a highly fatal and highly infectious disease: infection of the respiratory tract can be transmitted with ease across a 20-ft. ward and endanger life either directly through broncho-pneumonia, mastoiditis, and meningitis, or indirectly by setting up a gastro-enteritis. Yet both are nursed in open wards in hospitals, and usually by a staff quite inadequate in numbers and training to take full advantage of such technique as can be contrived to minimise the risks of contagion. The standards set by such authorities as S. F. Dudley and E. H. R. Harries for bed-spacing in open wards are rarely, if ever, achieved. M. D. Mackenzie in a survey conducted for the League of Nations Health Committee in 1934 found that the standard for children in general hospitals was 7 ft. between bed centres; whereas Harries in his Milroy lectures gives 12 ft. as a minimum for the avoidance of bacterial droplet infection.

In Bristol, in 1930, 10 lives out of every 100 were saved from a fatal broncho-pneumonia in a measles epidemic through the use of small isolation wards.[1] Almost exactly the same saving of life from enteritis was effected by G. H. and G. F. Dick, at an infants' nursery, by the institution of cubicles and an aseptic technique carried out by a sufficient staff.[2] Yet in most English hospitals it is considered not a crime but a positive virtue for a nurse, doctor, or attendant to "carry on" with a cold, sore-throat, or influenza, contact with which, to an infant, old person, or any patient worn down by sickness, may quite well prove to be the beginning of a last illness. Only those in executive authority can break this bad tradition, and none seems to have the courage to do so. In one general hospital in England, containing upwards of 600 beds for acute cases, there is not a single isolation cubicle. In this hospital, in 1932, an outbreak of measles in a children's ward was attended by five deaths directly attributable to the infection.

[1] Among 167 children nursed in large wards of 26 beds the mortality was 14 per cent.; among 150 nursed in cubicles of 4 beds it was 4 per cent. (Annual Report of the Medical Officer of Health for Bristol, 1930.)

[2] Sauer, L. W., *Amer. J. Dis. Child.* 1935, 50, 1159.

The old tradition that hospitals are institutions of charity dies hard. The patient is too often treated not as one asking for his due, or as a welcome customer, but as one demanding a not very convenient favour—especially if his complaint, however distressing to him, is regarded as of no special interest in the present state of medical knowledge and fashion.

Through sheer lack of sensitiveness on the part of the administration he is allowed to wait in uncouth and often cold surroundings for hours. And some are even brave enough to defend this state of things. The preposterous statement that working-class women "like waiting," that they use the hospital outpatient department as a club, &c., is still often to be heard. Would that the people who make it could be obliged to return home (on foot) with the victims, to scrub the floors, do the household washing, cook the family meals, and shop in the crowded cheapjack market after the early shoppers have had the best bargains, in order to save halfpence. Insensitiveness to this chronic abuse is a matter of tradition and extends from governing committees and superintendents through medical officers, sisters, and senior nurses to probationers (who are at least powerless to prevent it). It has been proof against a good deal of public ventilation. The remedy is chiefly a matter of taking pains with the details of organisation, with the appointment of an extra clerk or two at £150 a year.

The waiting patient—often a child, particularly susceptible to infection, cold, and lack of food—seldom receives anything to eat during these hours except by the unofficial kindness of some nurse who "steals" from the hospital stores for the purpose. If admission is finally decided on, it may well be a further hour or more before his relatives or friends have complied with the formalities demanded, the actual execution of which should take five minutes. He and his friends, very possibly subsisting on the bare minimum provided by public assistance, have, unless the condition is critical and disabling, walked from their home, which may be several miles away, or paid their fares on the municipally owned tram or omnibus services, perhaps at the expense of next day's dinner.[3] His friends may continue to do so each day that they visit him. It may be that the ward which houses him subsequently develops some "officially" infectious disease and is quarantined: no notice is sent to his relatives, who waste their afternoon, their fares, and possibly sacrifice half a day's wages, to find a brief notice on the ward door announcing "closed to visitors."

In theory all desirable food is provided by the hospital: in practice many patients, whose relatives do not bring fresh eggs and fruit and the small luxuries sick people demand, will not receive them. Meals usually consist of a bread-and-butter breakfast, dinner, and a bread-and-butter tea. Having learnt to tolerate (in illness, when such demands on self-control are most difficult to support) the complete lack of privacy, the sights and smells of a ward in which death may be of almost daily occurrence, the unaccustomed hours, and nights disturbed by disquieting noises, the patient finds, often enough, that he is dependent for his personal comfort upon a grossly overworked staff, and stifles his dismay at

[3] A more serious blow, responsibility for which lies outside the public health service, as at present constituted, is the loss to the family of an unemployed man admitted to hospital of the benefit allowed in respect of his own person: this may amount to more than half of the total available income, yet rent and other fixed charges have still to be met. If his illness is of more than a few days' duration, his wife must apply for help to the relieving officer, but there will always have been some delay before her needs are met.

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the cold or tepid washing water, the crudely served and often unappetising and monotonous food. Upon his bed chart, hung for all to see above his head, may be clearly written Tuberculosis, or some other equally terrifying diagnosis. He may learn, by pure chance talk, of some grave decision in his case. An impressionable child of six, he may be placed for weeks, or months, in a ward full of adults.

* * *

It is true that, to outward appearance at least, a majority of patients, not excepting the children, in the large wards of a general hospital, surmount all the difficulties, "do well," and seem none the worse for their experiences. Here and there a management committee has remedied many of the defects described; but all of them are to be found in a majority of hospitals, whether voluntary or municipal. A warm-hearted ward sister may succeed in keeping spirits high and may mitigate many of the minor discomforts. But would it satisfy our consciences in war-time to read that soldiers in waterlogged trenches showed a fine spirit of fellowship and endurance if one knew that careless organisation had allowed them to go short of food, clothing, dug-outs, field telephones, ammunition?

Underlying the sufficient exploitation of medical science in hospital must be not only the desire of each member of the staff and managing committee to give his best, regardless of self-interest, but the possibility for him to do so by close association with the difficulties of his colleagues and the knowledge that his best thought and efforts will meet sympathy and not indifference or obstruction. The professional ethic is not as yet general enough, and strong enough, among doctors and nurses, for them to desire, in their daily work, only the appreciation due to conscientious endeavour.

*** *This concludes the four articles by A Hospital Physician. Next month Vratch will be responsible for these columns.*—ED. L.

PANEL AND CONTRACT PRACTICE

Sickness Experience in 1937

THE secretary of one of the trade-union approved societies in his report for last year says that from the point of view of claims for benefit the most disastrous influenza epidemic in the history of the society occurred during the first few months of 1937, and claims have continued on a new higher level since. He adds that the Minister of Health has stated that one epidemic immunises the population for a year or so, but so far as the particular society is concerned influenza claims are always present. The society has a little over 56,000 members, in the proportion of four men to one woman, and the average number of days for which benefit has been paid is as follows:

	Sickness		Disablement	
	Males	Females	Males	Females
1919–23	3·86	4·50	1·64	1·74
1924–28	4·35	5·54	2·26	2·41
1929–33	4·37	5·34	2·42	2·33
1934	4·12	5·13	2·68	2·82
1935	4·20	5·40	2·60	2·74
1936	4·32	5·31	2·51	2·53
1937	4·65	5·50	2·36	2·35

In 1937 about one-third of the members claimed sickness or disablement benefit.

The Return of Records

It is a pity that some practitioners continue to be remiss in returning forms of medical record on request. If the patient is still an insured person he has transferred to another doctor who ought to have the advantage of seeing any clinical notes which have been made. Clerical work may be a weariness to the flesh, but it is part of the insurance practitioner's terms of service, and it is usually found that the real reason for failure to transmit the medical records is not so much lack of opportunity as lack of method. For good or ill the medical records are a part of the health insurance system and the keeping of them in the sense of entering them up properly and the transmission of them when necessary should be viewed as essential parts of the machinery for the administration of medical benefit.

Extensions of Practice

Last week's supplement to the *British Medical Journal* reports an address by Dr. H. Guy Dain at Wandsworth Town Hall on Feb. 1st to which all practitioners in the London area were invited. Dealing with the extent to which national health insurance has become more exacting in recent years, Dr. Dain said that the greater precision in diagnosis which was now possible had certainly eased the anxiety of practice which sprang largely from uncertainty. On the other hand, the doctor now had to take an increasing number of specimens for the laboratory, to write more letters, examine more reports, and be familiar with new techniques such as that of injections. Insured patients consulted their panel doctors for more trivial complaints than they did; but, though this might be irritating, the principle was a good one, and doctors must be prepared to practise more preventive medicine in the future. The difficulty was to convince the general public that increased remuneration should accompany increased service and responsibility.

Turning to the question of a general medical service, Dr. Dain said that at present some 19 million people were tied to insurance practice and, allowing for 2 million who would obtain their medical attendance privately in any event, extension of the national health scheme might bring in another 19 million. Some people supposed, quite wrongly, said Dr. Dain, that such an extension would mean the end of general practice; so far from meaning its end, it would mean its consolidation. It would certainly be the end virtually of fee-paying practice, but the essential thing in medical practice was not the manner in which the practitioner was paid: it was the relation between himself and his patient. If it was a relation of free choice the practitioner was employed by the patient and the patient's interest was his first concern. If, on the other hand, the practitioner was appointed by the State, allotted an area, and paid a salary, he had no longer an undivided loyalty to his patient, for his employer was the State. The national health insurance system did not interfere in any material way with the relation between doctor and patient. Personally Dr. Dain looked forward to an extension of the insurance medical service by bringing in dependants of insured persons and all of like economic status, and at the same time an extension of the range of dental, ophthalmic, and specialist benefits. This question of extension was a matter to which every

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practitioner should give consideration, so that the representatives of the profession might reflect the opinion of their constituents and have a united body of support behind them.

B.P.A.

The British Provident Association continues to show a healthy growth, and in 1937 its income reached nearly £12,000. It is a coöperative organisation whose members pay an annual sum and can recover the cost of hospital, nursing-home, nurses' or doctors' fees if they or their dependants are ill. There is no income limit, though it is primarily intended for those of moderate means, and no deductions are made from the pooled subscriptions for commission or profit. Its schemes differ from insurance in that payments are adjusted to actual expenses, but its subscribers have the same undisputed right to financial assistance at times when misfortune might otherwise cripple them.

CORRESPONDENCE

M.O.H. AND PRACTITIONERS

To the Editor of THE LANCET

SIR,—The report by Mr. Harold Murphy on the outbreak of typhoid fever at Croydon will be closely studied by medical officers of health in order that they may find out if there are any ways in which their customary procedure in dealing with outbreaks of infectious disease may be varied or improved on, and it may be assumed that both the Society of Medical Officers of Health and the British Medical Association, between whom there exists the most cordial relations, will during the coming months give the matter their close consideration.

There is one important section of the report which unfortunately is not quite clear. I refer to the functions of the suggested committee of local practitioners to consult with the medical officer of health. It is true that Mr. Murphy does not actually suggest that "the more ready communication between the medical officer of health and the general body of practitioners" should take the form of a committee representative of local general practitioners, but it is evidently the view of Lord Dawson and other prominent medical men that it should take this form.

Now the universal practice of medical officers of health when confronted with a possible epidemic of a dangerous disease is to establish immediate contact, either by telephone or by letter, or by both, with *all* the local medical men practising in the area at risk, informing them of the danger, in order that they may get in touch with him at once if they have any patients with symptoms suspicious of the disease in question. It is also the universal practice for the local medical men to coöperate fully with the medical officer of health and refer to him without delay either definite or suspected cases of the disease. They expect and receive without question and without delay the fullest help which the public health department can offer them, usually in the form of *personal consultation with the medical officer of health at the bedside of the patient.* The medical officer of health can do no more; he dare do no less.

What then would be the function of the committee, which would necessarily consist only of a small proportion of the practitioners of the area? What information could be given to or by the committee which should not be given to *all* the practitioners in the area? The medical officer of health cannot delegate any part of his responsibility in dealing with an epidemic to any committee; he must personally be responsible for all information reaching *all* the practitioners direct. And when the practitioners have information of value to the medical officer of health, why should they not, in a situation where no time may safely be lost, transmit this information direct by 'phone to the medical officer as in the past?

In the face of recent legislation, especially the Local Government Act of 1929, which transferred all the old poor-law beds to the local authority, no one will question the advantage to both the medical officer of health and the local profession of a standing committee through which both sections may consult and coöperate; but in the presence of an actual epidemic of infectious disease it is not clear what useful purpose meetings of this committee would serve.

I am, Sir, yours faithfully,

HUGH PAUL,
Medical Officer of Health,
Feb. 16th. County Borough of Smethwick.

VENOUS THROMBOSIS AS A SIGN OF VISCERAL CANCER

To the Editor of THE LANCET

SIR,—If Dr. A. P. Thomson's statement as given in your last week's annotation (on p. 448) is correct that this sign "has been wellnigh forgotten of recent years and is generally ignored in modern practice," it is more than probable that comparatively few are aware, in this country at least, that Trousseau who first described it in his clinical lectures on chronic ulcer of the stomach and phlegmasia alba dolens presented this sign himself at an early stage of his last illness, which he bore with an exemplary fortitude. The poignant story of this occurrence including the revelation of the sign to his beloved disciple Dieulafoy, who succeeded him as professor in the Paris faculty, and the aggravation of his suffering by financial worries, is told in the "Journal des Goncourt" (vol vi, p. 235), as I have recently shown in a survey of the life and work of this great clinician published in the organ of the Westminster Hospital medical school (*Broadway*, 1937, 7, 2, 33).

I am, Sir, yours faithfully,

London, S.W., Feb. 20th. J. D. ROLLESTON.

STREPTOCOCCAL MENINGITIS

To the Editor of THE LANCET

SIR,—I cannot refrain from challenging one of Mr. Layton's statements in your issue of Feb. 12th concerning Mr. Cawthorne's paper on streptococcal meningitis. "Neck rigidity," said Mr. Layton, "in such cases is the first, and should be the only symptom."

I have studied my notes of cases of meningitis, 35 secondary to ear infection and 16 to nasal infection—51 cases in all. In 5 of the ear cases rigidity or stiffness of the neck was absent. In 12 of the nasal cases there was no rigidity. In the remainder the onset of rigidity varied from twelve hours to three days after the diagnosis had been made by the examination of the cerebro-spinal fluid, or after the onset of the severe headache and change of mentality. It is the change of mentality, headache, tenderness

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over the occipito-atlantal ligament, and occasionally tenderness on pressure on the eyeballs which are the early symptoms.

The exact anatomical or physiological cause for the rigidity or stiffness of the neck muscles does not appear to be known. Some authors state that it is due to meningeal irritation. Dr. C. P. Symonds says that rigidity develops when the meninges of the dorsal aspect of the medulla are inflamed, and that meningitis does occur without rigidity being present. My own post-mortem records show that rigidity has always been noted when the meningitis is basal, and when the cisterna interpeduncularis is full of pus. It is sometimes absent in a cortical meningitis.

I am still pursuing the cause of rigidity in meningitis. The earliest possible diagnosis of meningitis is of the greatest importance if these cases are to be saved. I emphatically state that the diagnosis should be made before rigidity of the neck appears. An early and certain diagnosis can always be made by examination of the cerebro-spinal fluid. If the onset of meningitis is suspected or expected there should be no hesitation in performing a simple and harmless lumbar puncture. In my experience 98 per cent. of the cases with rigidity of the neck have died in spite of vigorous treatment, and valuable time has been lost by waiting for this sign.

I am, Sir, yours faithfully,

EDWARD D. D. DAVIS.

Charing Cross Hospital, W.C., Feb. 18th.

ARTERITIS OF THE TEMPORAL ARTERIES

To the Editor of THE LANCET

SIR,—Dr. Jennings in your last issue draws attention to arteritis of the temporal arteries, and it may be of interest to describe a case that differs from his mainly in the shorter duration of the illness.

Miss A, aged 71, was seen with Dr. A. L. Bastable on Dec. 16th, 1937. On Dec. 2nd she had complained of pain in the neck, and the temperature was found to be 102° F. On Dec. 4th she had pain in her face, and red tender nodules about the size of a threepenny piece were palpable along the course of each temporal artery. On Dec. 9th she had a sore-throat, and for this she was given Prontosil album 50 grains daily for four days, at the end of which time the symptoms had abated and the temperature was normal. On Dec. 16th she became disorientated, complained of pain in her chest, and said she could not move her arms to feed herself.

The pulse-rate was 110 and the blood pressure 136/80; temperature 100·4° F. The tongue was red, dry, and fissured. Some muco-pus was seen on the soft palate. Hard small nodules could be felt along the course of each temporal artery, but they were not red or tender. No pulsation could be made out in either artery. The confused state of the patient made examination difficult, but she appeared to be able to move her arms. Extrasystoles were present: otherwise heart and lungs were normal.

She was admitted to hospital, and in the ward had photophobia necessitating the use of an eye-shade. Dr. James Fison reported some peripapillary atrophy in each eye. The hæmoglobin was 74 per cent.; red cells numbered 4·6 million and leucocytes 12,500 (82 per cent. polymorphs, 17 per cent. lymphocytes). The blood-urea was 36 mg. per 100 c.cm. and the Wassermann reaction negative. Mr. A. B. Pavey-Smith reported nothing abnormal in throat, nose, or sinuses.

The nodules became smaller, and by Dec. 30th, when the question of removing one for examination was discussed, could no longer be palpated with certainty. The temperature was normal on Jan. 3rd. At this time the leucocytes were 7600, and the blood-urea 20 mg. The pulse-rate still remained about 100 when she was discharged on Jan. 14th.

Dr. Bastable tells me that subsequently the patient suffered from muscular rheumatism. Then a rapid improvement set in with a return of her appetite. She is now in her usual health.

I am, Sir, yours faithfully,

Harrogate, Feb. 20th. C. W. C. BAIN.

CONTRACEPTION AND FERTILITY

To the Editor of THE LANCET

SIR,—Mr. Alabaster has taken exception to the National Birth Control Association for challenging the statement of an eminent gynæcologist. Mr. Green-Armytage has contended that the use of contraceptives early in marriage is inimical to pregnancy. This is a charge of the utmost gravity, which, if it were true of the contraceptive technique advocated by the National Birth Control Association, would entail a modification of its policy and work.

The N.B.C.A. recommends the teaching, where necessary and suitable, of the use of a rubber occlusive cap, combined with an application of a suitable spermicide. The alternative method advocated—the use of a sheath or condom—is limited in its application because certain men are quite unable to tolerate it.

For many newly married women it is imperative that pregnancy should be postponed, as for instance when the woman is working and her husband unemployed. The above measures are considered to be essentially prophylactic, both for avoiding "anxiety states," and, of utmost importance, for combating the high incidence of criminal abortion with its subsequent morbidity and sterility.

Mr. Green-Armytage has replied to our remonstrance, that "statistics can be made to prove anything . . . and they naturally are biased." But is it not scientific custom to consult statistics and records in the expectation of finding at least as high a degree of dependability as that gained by the personal impression of an observer? Particularly must this be so when the subject is one such as this, which invites prejudices of a social or ethical nature.

The quotations offered by Mr. Alabaster concerning the relationship between endocervicitis, erosion, and sterility seem to add confusion to the original issue. If there were any evidence that the above technique did, in fact, induce these conditions (or influence fertility in any other way), these suggestions would become a matter of gravest concern. As this has not been evident among large numbers of control cases, the contention does not appear to be relevant. Some of the clinics have maintained records of the "condition of cervix" over a period of many years. Nulliparous and multiparous patients return at six-monthly intervals for supervision, and for general advice upon spacing their pregnancies. The clinics are heavily attended, and are regularly giving instruction in this important subject to post-graduate practitioners.

Mr. Alabaster questions the competence of the N.B.C.A. to express opinion. The association is fortunate in counting among its officers and active committee members Lord Horder as president, Sir Walter Langdon-Brown as vice-president, Prof. F. J. Browne, Mr. Aleck Bourne, Mr. Harold Chapple, Mr. A. C. Palmer, Mr. L. C. Rivett, and Mr. Cedric Lane-Roberts.

I am, Sir, yours faithfully,

London, N.W., Feb. 21st. JOAN MALLESON.

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THE NEXT INFLUENZA PREVALENCE IN LONDON

To the Editor of THE LANCET

SIR,—In your issue of Dec. 15th, 1934, I analysed the influenza epidemics in London since 1889, and showed that after an epidemic which had reached a maximum before the ninth week of the year, more than a year of freedom from prevalence followed.

It will be remembered that the last epidemic reached its peak in the second week of last year (344 deaths). Since then there has been no epidemic prevalence; but if history repeats itself a prevalence may be expected which will reach a maximum after the ninth week of this year. The last occasion prior to 1937 in which an epidemic reached a maximum in the second week of the year was in 1922. The relation of this epidemic to the next following prevalence is shown in the following figures, the corresponding deaths up to Feb. 12th of this year being added for comparison:—

NUMBER OF WEEK IN YEAR AND DEATHS THEREIN (LONDON)

Year.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1922	354	551*	443	320	191	109	92	77	49	30	21	17	21	20
1923	9	13	13	14	15	9	14	15	18	17	21	39	34	56*
1937	311	344*	273	154	101	50	33	23	16	12	21	17	17	19
1938	7	15	12	9	8	3	..	..	..	..	..	..	..	..

* Week of maximum deaths during prevalence.

I am, Sir, yours faithfully,

Kensington, W., Feb. 19th. B. E. SPEAR.

PSYCHONEUROSIS IN HOSPITAL PRACTICE

To the Editor of THE LANCET

SIR,—Dr. Bruce Pearson is to be congratulated on his article of Feb. 19th describing his painstaking analysis of 1297 first attendances at the general medical out-patients' department of Guy's Hospital. His object was to ascertain the proportion whose symptoms were of psychoneurotic origin, and his results are in some directions surprising.

1. The diagnosis of psychoneurotic illness was made in only 16 per cent., though he states that this may be regarded as a minimum figure. My own experience leads me to assess the proportion at nearer 50 per cent. in general medical out-patient departments; and, of course, at a much higher figure in neurological clinics. I only regret not having compiled statistics with which to check my impression. The reason for this high proportion at hospitals is, no doubt, the difficulty that these cases give the general practitioner from the point of view of both diagnosis and treatment, the real proportion of psychoneurosis to all cases of illness being much less.

2. The diagnosis of psychoneurotic illness was made twice as often in women as in men. Again my own experience, unbacked by figures, has not impressed me that males are less prone to this type of illness than are females. It would be difficult to understand why they should be, seeing that they are, if anything, more exposed to anxieties of an economic nature than are women, and cannot be regarded on an average as being composed of superior material.

3. The highest incidence of psychoneurotic illness in both sexes was in the age-group 20–30, whereas it was negligible after the age of 50, and there was no menopausal increase. No doubt the over-thirties have become better adjusted to life; but it is a matter of experience that "nerve," willingness to take a chance, and recoverability from illness, disaster, and mental and physical strain are greater while the impetuosity and resiliency of youth still remain than in middle age with its greater circumspection, greater responsibilities, and reduced opportunity of making a fresh start. In the case of industrial workers, financial security becomes progressively less after forty, when it becomes increasingly difficult to obtain employment in the labour market. In practice menopausal symptoms are common, and after this age failure of adjustment to growing old is frequently met with.

No doubt sampling accounts for the differences in different districts; and menopausal disorders could be classified equally well as endocrine disturbances, thus escaping inclusion among the psychoneuroses in the analysis.

Dr. Bruce Pearson alludes to the fact that in those whose symptoms are dated from physical or psychic trauma it is probable that the cause to which the symptoms are attributed is not the real one. This point should be stressed in the hope of getting rid eventually of the misleading label "traumatic neurasthenia" so often applied to psychoneurotic illness supervening in those who have sustained a physical injury or an emotional disturbance. A continuing illness can only be maintained by a continuing cause and not by a past event.

I am, Sir, yours faithfully,

Harley-street, W., Feb. 21st. B. BUCKLEY SHARP.

JOINT TUBERCULOSIS COUNCIL

AT the conclusion of a busy morning session last Saturday the president of the Joint Tuberculosis Council, Dr. S. Vere Pearson, entertained the Council and some guests to luncheon at the Hotel Russell. In proposing The Guests, Dr. Pearson remarked that the tuberculosis world acts mostly through its officers and their personal relations with the practitioner. He thought this was not a bad system. Where the Council came in was simply through a number of voluntary consultative committees, the drawback being that they had no funds available. Dr. Pearson regretted the retirement of their secretary, Dr. Ernest Ward, who had inspired the Council during its fourteen years of existence by his initiative, devotion, skill, and good temper.—Sir Henry Brackenbury, who responded, while agreeing that the economic encroachment by the tuberculosis service on the practitioners' domain had passed, said there was still a feeling that by undue intrusion into the practitioners' capacity, by deprival of experience which he valued, and by relieving him of responsibility which he ought to have, the practitioner was in so far becoming a less competent servant of the public. Was this, he asked, inevitable?—Dr. L. Haden Guest, M.P., proposing The Council, suggested that to its administrative and scientific functions it should add yet another—namely, to bring forward knowledge in such a form as to influence public opinion. There were, he said, now only four active medical persons in the House of Commons, where it was most desirable to have properly set out the right views on the causes of tuberculosis.—Dr. Ward, responding, said he gave up office with thankfulness tinged with regret, his task being incomplete. He still wanted to ascertain why tuberculosis was more rife in some places than others; he thought that epidemiological information might be organised in the same way as meteorological; and he still felt not enough was being done in the therapy of tuberculosis.—Dr. Stella Churchill proposed The Chairman in a few happy phrases, and Dr. Pearson replied with a word of thanks.

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IRELAND

(FROM OUR OWN CORRESPONDENT)

THE DUBLIN HOSPITAL PROBLEM

A STATEMENT appeared in the *Irish Times* of Feb. 19th to the effect that the Minister for Local Government and Public Health had decided to accept the recommendation of the Hospitals Commission for the establishment of four large voluntary hospitals in Dublin. If the information is accurate the main policy for which those interested in the voluntary principle have been contending will have been accepted. The recommendation of the Commission had been made some two and a half years ago and had been received with almost universal approval by the medical profession. Urgent demands were made, however, from other quarters for the establishment of a municipal or rate-supported hospital, and the long period taken by the Minister before coming to his decision had given rise to fears that the plan of the Hospitals Commission might be rejected in favour of the other project. It was unfortunate that the two schemes were put in competition with each other, for instead of being rivals they might well be complementary. There is room, and probably need, for development both of the voluntary hospitals and of the public (rate-maintained) hospitals. The scheme now believed to be accepted is for six of the present voluntary hospitals, which range in accommodation from 110 to 350 beds, to be reorganised as four larger hospitals with an accommodation in each of 500–600 beds. This reorganisation is to be attained by the individual development of each of the three larger hospitals—the Richmond Hospital, St. Vincent's Hospital, and the Mater Misericordiæ Hospital—and the amalgamation into one of the three smaller—Mercer's Hospital, Sir Patrick Dun's Hospital, and the Royal City of Dublin Hospital. If some such scheme had not been adopted grave fears were felt that clinical teaching might be endangered and the status of the Dublin school of medicine damaged.

THE IRISH MEDICAL PROFESSION AND THE SENATE

The new Senate, the second house in the Irish legislature, is to be based mainly on the vocational principle. The right of nomination of candidates for election by an electoral college consisting of the members of the Dáil and a number of representatives of the local authorities rests with a number of vocational bodies, and the register of such vocational bodies has been completed and published. These bodies were grouped into certain panels defined in the Act, and the decision as to the suitability of the several bodies for admission to a panel was committed to the Senate returning officer, a distinguished officer of the civil service, subject to appeal to a special appeal committee consisting of members of the Dáil. The register is now complete, the original list drawn up by the returning officer having been upheld by the appeal committee in the few instances in which appeals were lodged. Several medical bodies had applied for registration—the Irish Free State Medical Union, the Royal College of Physicians, the Royal College of Surgeons, the Royal Academy of Medicine. The universities did not apply, having direct representation in the Senate. Of the medical bodies which applied the only one the application of which was granted was the Royal College of Surgeons. The only one of those rejected which lodged an appeal was the Medical Union. It is of some interest that while the returning officer refused the application on one ground the appeal committee is understood to have rejected it on a different ground. The committee based its decision, it is understood, on its interpretation of the following clause in the Seanad Electoral (Panel Members) Act, 1937:—

"No body which is composed wholly or mainly of persons who are in the employment of the State or of persons who are in the employment of local authorities and the objects of which include the advancement or protection of the interests of such persons in relation to their said employment shall be eligible for registration in the said register."

It is true that the Medical Union contains a certain number of persons in the employment of the State and a large number in the employment of local authorities, and that its objects include the advancement and protection of their interests in such employment, but it does not seem to be established that the Union consists "wholly or mainly" of such persons. From the list of members of the Union it would appear that less than half its members are in either class of public employment, and it is hard to see how the committee arrived at its interpretation. The register as completed has given rise to very widespread criticism and it is impossible to discover on what general principle or principles the returning officer or the committee acted.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

BETTER CARE FOR MOTHERS AND BABIES

ON Jan. 17th and 18th there was held in Washington, D.C., a conference called by Katherine F. Lenroot, chief of the Children's Bureau, to consider the existing resources for the care of mothers and new-born infants in this country, measures which have been successful locally in reducing maternal and infant mortality and the ways by which such services may be made everywhere available. There were 481 registered delegates at the conference, and they included representatives from 86 national organisations. The conference was addressed, among others, by Dr. Thomas Parran, surgeon-general of the public health service, who reminded it that all health problems are family problems and that family health is one phase of family security. He referred to the findings of the recent nation-wide survey of sickness as further evidence of the close relationship between poverty and disease. The Social Security Act which came into effect two years ago was a first effort to break the vicious circle of poverty, ignorance, and disease. On this existing structure he would add a nation-wide programme which would provide:

"(1) For all citizens those community measures of sanitation and disease prevention which are necessary if any of us are to be safe.

"(2) For the underprivileged third of our population, such specific measures of prevention and treatment as good maternity care, child health protection, the control of tuberculosis, syphilis, pneumonia, cancer—conditions which are too important to the nation as a whole for us to permit continued neglect.

"(3) For areas without them, the physical facilities for good health, such as hospitals, sanatoria and health centers, without which no national health programme can operate effectively.

"(4) For those on relief and dependent upon public funds for the other necessities of life, a minimum standard of general medical, dental, nursing and hospital care."

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He would put this programme under local operation "with State supervision and Federal guidance," the cost to be borne by local and State funds with Federal assistance.

A committee on professional resources recommended the need for providing services of qualified medical men to all; for training "obstetric nurses" for areas in which medical care is not available; for consultant physicians; for improved educational facilities for hospital care "when indicated"; and the provision of equipment and trained personnel to care for premature infants.

The committee on community resources recommended appropriations for (1) training public health personnel, (2) payment of qualified local physicians and specialists, (3) more hospital beds.

PROPOSED APPROPRIATION FOR SYPHILIS CONTROL

The great popular interest in the campaign against syphilis has resulted in the introduction into the House of Representatives by Mr. Bulwinkle and into the Senate by Mr. Lafollette "to impose additional duties upon the United States Public Health Service in connection with the investigation and control of the venereal diseases." The Bill authorises the appropriation of three million dollars for the next fiscal year, doubles that for the next year, doubles it again for the succeeding years, and calls for 25 million dollars for each of the following ten years. The subsidy is to be distributed among the several States upon the basis of (1) population, (2) the extent of the venereal disease problem, and (3) the financial needs of the respective States. Rules and regulations for carrying out the purposes of the Act will be prescribed by the surgeon-general with the approval of the Secretary of the Treasury and after consultation with the State and Territorial health officers.

ANTIPNEUMOCOCCUS SERA

New York State has been supplied by the division of laboratories-research of the State health department with antipneumococcus sera of types V, VII, and VIII during the last three months. Approximately 2400 packages have been distributed between Nov. 1st and Jan. 31st. Since strict precautions are taken against wastage of this expensive material we must conclude both that the incidence of pneumonia of these types is commoner than we had supposed and also that the physicians of the State are quick to take advantage of the new specific sera. The 200 reports received to date on the use of the new sera have in general been highly favourable.

PUBLIC HEALTH

Payment for Maternity Services

THE Central Bureau of Hospital Information has recently inquired into the payments made by local authorities to voluntary hospitals for maternity services.[1] Of the 94 hospitals to which their questionnaire was sent 86 replied, comprising 19 maternity and 67 general hospitals. In 43 of these there are no arrangements with local authorities for antenatal work, and in 4 of the general hospitals work is undertaken on their behalf without payment. In the remainder payments are made in various ways. In some cases there is an annual grant, varying from £5 in a small provincial hospital to £5000 in a large hospital with 50 maternity beds reserved for the local authority. In two London general hospitals an inclusive fee of from ten shillings to two guineas is paid per case to cover in-patient and out-patient treatment, and in a number of others the fees for in-patients include antenatal attendances. In a few clinics a fee of from 1*s.* 6*d.* to 2*s.* is paid per attendance, in two the authority pays the actual cost, and in two others it pays a fee of from one to two guineas per session. The payments for in-patients not covered by an inclusive fee are made on either a per-week or an actual-cost basis, the maximum weekly fee being £5 5*s.* and the minimum 25*s.*, the former including antenatal care. Finally some local authorities limit their contributions to a grant towards the upkeep or more usually the rent of the premises.

"Certified Because of Old Age"

In West Wales (Carmarthen, Cardigan, and Pembroke) it is being said that the older residents at the public assistance hospitals are transferred too readily to the mental hospital that serves the three counties. The aged have only to give a little trouble (so runs the allegation) and the medical officers at the institutions will promptly arrange for their transfer under certificate.

There are doubtless difficulties on both sides. It is far easier to care for the fractious and senile where there are enough nurses than where there are not. Justices are still to be found suspicious that medical suggestions for custodial care are made too easily, and such vigilance may outrun wisdom. Nevertheless, the present criticisms may be the start of more understanding between the public assistance hospital, the mental hospital, and the magistrate. Some of the current difficulties may have arisen from imperfect appreciation or use of the opportunities for admitting senile patients into mental hospitals as temporary and not as certified patients. A survey in selected areas of the mild mental cases in the infirmaries and of the harmless cases in the mental hospitals might produce interesting if not significant figures.

Typhoid in Somerset

The outbreak of typhoid fever so far confined to certain districts of Somerset near Bridgwater seems to have spent itself. The fortieth case, said to be due to secondary infection, was notified on Monday last. There have been 6 deaths, all at West Huntspill, where two-thirds of the patients lived, the remainder coming from Highbridge. Inquiries into the dietary of the affected families incriminate food eaten at Christmas, but this source is no longer active. Milk and water are still being boiled, though there is no sign that they are spreading infection, and the eating of ducks' eggs is forbidden because the birds frequent the reens draining the sewage from the neighbourhood.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED FEB. 12TH

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2326; diphtheria, 1738; enteric fever, 21 (24 "expected"); pneumonia (primary or influenzal), 1155; puerperal pyrexia, 184; cerebro-spinal fever, 35; acute poliomyelitis, 9; acute polio-encephalitis, 1; encephalitis lethargica, 2; dysentery, 242; ophthalmia neonatorum, 108; No

(*Continued at foot of opposite page*)

[1] Memo. No. 114. From the Bureau at 12, Grosvenor-crescent, London, S.W.1. 2½*d.* post free.

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OBITUARY

RICHARD HUXLEY FISH, M.D. Camb., M.R.C.P. Lond.

ON Feb. 15th Dr. Richard Fish died suddenly in the Central Middlesex Hospital of subarachnoid hæmorrhage at the age of 32. He was the only child of Dr. Cecil Fish who died when he was a boy, and was a scholar of Clare College, Cambridge, where he took first-class honours in the natural sciences tripos in 1927. He then went to St. Thomas's where he qualified in 1930, getting his Cambridge M.B. in 1934 and his M.D. and a diploma in child health in 1936. His main interest was with children, and he was house physician in that department at St. Thomas's and medical officer at the High Wood Children's Hospital. Children instinctively trusted him and he had a modest charm and an enthusiastic joy in his work which gave his patients confidence. His view of life was cheerful, and he had that guileless spirit which believes the best of everyone. He made many friends. At High Wood he studied miliary tuberculosis and published his views in a monograph in the earnest and careful style which characterised all his work. Later he was medical officer at Colindale Hospital, and he was beginning to be recognised as an authority on phthisis. He leaves a widow and three sons.

Dr. SARA ELIZABETH WHITE, who died at Manor Park, Essex, on Feb. 10th in her eighty-third year, was a lifelong champion of the mentally afflicted. She held the view that it was both unnatural and unscientific to regard mental treatment as a specialty, and that the dread of the prison bars of detention had stood in the way of every early effort at success. We want places, she used to say, where early cases will not be afraid to come of their own accord for treatment, hospitals where prevention and common sense will come into action much earlier. We want, in fact, not more detention but far less. It was this conviction that led her to follow in the galleries of the House of Commons every stage of the Mental Treatment Bill of 1915, and after it was passed to do her utmost to ensure its widest possible application. Dr. White was born at Orange Hill, Tandragee, co. Armagh, and was educated at University College, London, and Westfield College, taking her B.Sc. Lond. in 1891 with honours in physiology, and qualifying in medicine in 1896 when she was in her forty-second year.

Mr. HARTLAND S. WRIGHT, who died on Feb. 16th in his ninetieth year, had been chairman of the Bristol publishing house of Messrs. John Wright and Sons, Ltd., since the incorporation of the company seventy years ago. It was he who saw the possibilities of the *Medical Annual*. Starting in 1883 with a modest volume of some 300 pages printed in Bristol by the present proprietors for a London publisher, he secured the coöperation of the late Dr. Percy Wilde and built up a year book which came to have a world-wide circulation. A portrait of Mr. Hartland Wright very properly appeared in the jubilee issue of the *Medical Annual* in 1932 at the end of the gallery of past and present contributors.

(*Continued from previous page*)

case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Feb. 18th was 4676, which included: Scarlet fever, 817; diphtheria, 1349 (carriers 46); measles, 1168; whooping-cough, 276; puerperal fever, 16 mothers (plus 6 babies); encephalitis lethargica, 282; poliomyelitis, 1. At St. Margaret's Hospital there were 28 babies (plus 14 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from enteric fever, 40 (6) from measles, 6 (0) from scarlet fever, 24 (4) from whooping-cough, 29 (3) from diphtheria, 65 (20) from diarrhœa and enteritis under two years, and 40 (3) from influenza. The figures in parentheses are those for London itself.

Croydon reported the only death from typhoid. Liverpool had 15 deaths from measles, Manchester 6. Liverpool also reported 5 fatal cases of whooping-cough, Birmingham 3. Diphtheria was fatal in 18 great towns, Liverpool reporting 8 deaths, no other great town more than 2.

The number of stillbirths notified during the week was 301 (corresponding to a rate of 43 per 1000 total births), including 49 in London.

THE LANCET 100 YEARS AGO

February 24th, 1838, p. 779.

From a leading article on the poor law, then being inquired into by a parliamentary committee.

THE EFFECT OF LOW DIETARIES, AND CONFINEMENT IN WORKHOUSES, ON HEALTH

When the introduction of the Poor-Law Amendment Act was agitated, the question of dietaries assumed considerable interest. The dietaries were to be reduced; and it became a desideratum to prove that spare diet would not be prejudicial to the frame. Mr. CHADWICK undertook the task, and, with a degree of ingenuity for which he has obtained some credit, set the question then at rest to his employers' satisfaction. The dietaries varied considerably in different gaols. Mr. CHADWICK divided sixty gaols into three classes of twenty each; one of "Lowest Dietaries," one of "Full Dietaries," and a third where the dietaries were "Intermediate." From a comparison of the number of persons committed, the number sick, and the number of deaths, he deduced, as a result, that the lowest dietaries were healthful, and that the full dietaries of prisons were the sources of sickness and death to considerable numbers. No one had ever suspected this, or had conjectured that a daily average of 2¼ lb. of bread, vegetables, and meat (half an ounce of the latter), with a little gruel, and water at discretion, costing 4*d.*, would produce the fatal consequences of plethora. Such, however, was the alleged fact, demonstrated in figures, with mathematical precision:—

	Daily cost.	Sick per ct.	Deaths.
20 Lowest dietaries ..	3¼*d.* ..	3¼ ..	1 in 622
20 Full dietaries ..	5½*d.* ..	23½ ..	1 in 266

. . . A nearer examination of the facts shows that the above results are erroneous, the data having been ingeniously collected, but inaccurately interpreted. . . . Mr. CHADWICK fell into error by not adverting to the fact, that prisoners on the lowest dietaries, . . . were detained only thirty-four days; while in the gaols with what he has called "full dietaries," they remain eighty-two days on an average. It would have been strange if the deaths in thirty-four days had equalled the deaths in eighty-two days. . . . The proper quantity of food for masses of men or animals is the average quantity that they eat where the supply is regular and unlimited. When subsistence is stopped, or reduced much below this standard, the well-known consequences of famine ensue; and every degree below the standard has a corresponding death. Such is the result of all the statistical facts that we have seen—contrary to Mr. CHADWICK'S deductions, but conformable enough with the experience and conduct of mankind—who only lived on the "wholesome roots of the earth," and "the crystal stream," when they had no alternative; and never sighed for the age of acorn-eaters, but over tables spread with Roman luxuries, or eulogised watergruel on less than 1000*l.* per annum.

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EPIDEMIC POLIOMYELITIS AND ENCEPHALITIS

PROF. FLEXNER'S REVIEW

RECENT developments in the study and prevention of poliomyelitis and epidemic encephalitis were described by Prof. Simon Flexner, formerly director of the Rockefeller Institute for Medical Research, New York, in a lecture at the University of Cambridge medical school on Monday last.

After a historical introduction he gave an account of the methods of ingress and egress of the virus of poliomyelitis in the human body, and then turned to the subject of active immunisation. Monkeys, he said, can be quite readily immunised by increasing doses of the virus, but owing to differences in sensitivity some of them always develop the disease during the process. In man two chief forms of vaccine had been used for active immunisation—namely, formolised vaccine and vaccine treated with sodium ricinolate. Both had now been abandoned. The first method gave almost no antibody production, presumably because the virus was dead. The second produced antibodies, but gave rise to active disease in some of the patients. Immunisation had also been attempted with mixtures of virus and immune bodies. This method was quite safe, but produced only a very low degree of immunity.

Failure of these methods led to attempts to block the route of ingress of the virus. It was found in guinea-pigs that tannic acid instilled into the nasal cavity coagulated albumin over the olfactory organs and gave protection from instillation of the virus. A similar treatment with 1 per cent. zinc sulphate was extraordinarily effective in protecting monkeys. Protection might last as long as three months with a single treatment. In the human patient treatment of the nose with zinc sulphate was more difficult because instillation is obstructed by the middle turbinate. Treatment had therefore to be carried out by ear, nose, and throat surgeons under direct vision, and was expensive. In a recent Toronto epidemic 5000 cases were treated and compared with 5000 controls. The incidence in the respective groups was 2·1 per cent. and 2·9 per cent., a difference that is not significant.

In dealing with the question of second attacks, Dr. Flexner said that there was no bacterial or virus disease in which second attacks have not been described. In monkeys it was relatively easy to produce second attacks in animals which had previously been paralysed. In man there were at least a dozen or twenty cases on record of second attacks. The highly characteristic rise in cell count in the cerebro-spinal fluid which occurred in monkeys although the virus did not reach the cerebro-spinal fluid suggested a method of determining whether in epidemics mild or abortive cases had really been cases of poliomyelitis.

In epidemic encephalitis a great advance had been the successful transmission to monkeys and mice of the virus recovered during the epidemic in 1933 in St. Louis, Missouri. This development had made it possible to say definitely that the St. Louis epidemic was immunologically different from encephalitis lethargica, and also from the Japanese epidemic of 1924. This, however, did not mean that these various epidemics were necessarily different diseases; for poliomyelitis, which was undoubtedly a single disease, was known to be caused by different strains of virus which were immunologically distinguishable.

THE SERVICES

Army Medical Services

THE War Office announces the following appointments:—

Colonel F. CASEMENT, D.S.O., M.B., deputy director-general, Army Medical Services, at the War Office, will be promoted to the rank of major-general and to be deputy director-general of medical services, Southern Command, from April 15th, 1938, in succession to Major-General O. Ievers, C.B., D.S.O., M.B., K.H.S., who will vacate the appointment on completion of four years' service as a major-general.

Colonel O. W. MCSHEEHY, D.S.O., O.B.E., M.B., at present assistant director of medical services, Home Counties Area (West) at Woolwich, to be deputy director-general, Army Medical Services, in succession to Colonel Casement.

Presentation of a Banner to the R.A.M. College

On Feb. 18th, in the library of the Royal Army Military College at Millbank, Sir James Hartigan, director-general of the Army Medical Services, presided over a distinguished company when Lady Keogh presented the banner of a knight grand cross of the Order of the Bath, bequeathed to the College by the late Lieut.-General Sir Alfred Keogh. In presenting the banner Lady Keogh said:

"Just before my husband died he told me that he wished his banner to go to this mess. I hope that it will remind you and future generations of all he did for his corps. From the time he was made a member of the reorganisation committee in 1901 he never ceased to use all his energy and the whole force of his character to helping to make the Army Medical Corps into a thoroughly scientific and efficient branch of the Army and it is only recently since I have been going through old letters and papers that I realise what an uphill and arduous task he had—at any rate during his first years at the War Office. He never spoke of his work at home. He never spared himself and he was completely without personal ambition; but he thought no honour too great for the corps of which he was proud and in which he had great faith. Just before he died he said, 'I loved the soldier—he is the best fellow in the world, and I have done my best for him.' He said what had been the leading principle of his life."

In accepting the banner and crest on behalf of the College, Major-General W. P. MacArthur said:

"It has been a disappointment to us that the banner could not be displayed in association with Sir Alfred Keogh's portrait, but the banner by reason of its size, and the colours of its heraldic emblazonment, would render any picture in its neighbourhood ineffective. Nor would it be satisfactory to hang the banner from its staff unprotected, for the corrupting influences of moth and rust and London fog would slowly bring about its disintegration. And so, acting on professional advice, the banner has been placed in its present case where it will remain preserved indefinitely as a memorial and an inspiration—not that we in the College need any such memorial, for Sir Alfred Keogh's noblest monument, in the form of the College itself, stands around us."

Waziristan Operations

The following are among those brought to notice by the Commander-in-Chief in India for distinguished services during the operations in Waziristan from Jan. 17th to Sept. 15th, 1937:—

Major-General W. H. Hamilton, Lieut.-Colonel R. K. Mallam, Colonel R. E. U. Newman, Colonel

(*Continued at foot of opposite page*)

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PARLIAMENTARY INTELLIGENCE

ABOLITION OF NIGHT BAKING

ON Feb. 18th Dr. Haden Guest moved the second reading of the Bakehouses Bill to prohibit night work in bakehouses. He said that a third of the 190,000 bakers worked at night. He had started with the idea that there was no evidence of serious deterioration among bakers, but had found that this was not so, and he believed that there had been no medical men on either of the committees which examined this question. The men had to work in a dusty atmosphere at a temperature of 70° to 80° F., reaching 100° F. in summer, and in a glare of light which affected their eyesight. They had inadequate time for meals and their sleep in the daytime was likely to be disturbed. The registrar-general reported that they had a high death-rate from phthisis, alcoholism and bronchitis and that hernia in them was excessively fatal. Opposition to reform came from the large factory bakers, some of whom, in Dr. Guest's opinion, produced bread of poor quality. Night bakers were cut off from the social life of their fellows and families, and could take no part in the Government's fitness campaign. Their work might almost be called slavery. Mr. Marshall seconded the motion, and Sir A. Pownall then moved an amendment that in view of the findings of the recent departmental committee that legislation would fall far short of removing the disadvantages of night baking and would cause hardship in many cases, a more effective amelioration of conditions might be secured through improved organisation of the industry and applying the Trade Boards Act to it. Mr. Fleming seconded the amendment. Dr. Salter, in supporting the Bill, said that no trade board would have any power whatever to abolish or reduce night baking, but the Labour Party wanted a trade board to regulate hours and wages. The night baker could be recognised by the extraordinary pallor of his countenance and of his mucous membranes. Anæmia was the explanation of the remarkable listlessness displayed by these men. It was recognised by physiologists that the vitality of the average human being was at its lowest in the small hours of the morning; the rapidity of nervous reaction was also reduced, which meant greater proneness to accident. Mr. Geoffrey Lloyd, Under-Secretary to the Home Office, said that many misguided people liked their bread fresh, though he understood that medical opinion was against it. The organisation of the baking trade was unsatisfactory. One of the worst problems was that of the underground bakehouse, but higher standards would be enforced under the new Factories Act. The questions of bad conditions, long hours, and unduly low wages were even more important to the ordinary working baker than night bakery. The Government thought a new approach to these problems would emerge from their policy of a trade board and they expected good results from it.

The amendment was negatived by 147 votes to 126 and the Bill was read a second time.

NOTES ON CURRENT TOPICS

Lunacy and Mental Deficiency in Scotland

IN reply to a question by Miss HORSBRUGH about the unsatisfactory condition of the present statutory law relating to lunacy and mental deficiency in Scotland, Mr. ELLIOT said he had appointed a committee to review the law, of which the members were: the Hon. Lord Russell (chairman), the Hon. Mrs. J. E. Hamilton, Prof. David Kennedy Henderson, M.D., Sir James Colquhoun Irvine, F.R.S., Mr. William Leonard, M.P., Major Basil Hamilton Hebden Neven-Spence, M.P., Mr. William Donald Patrick, K.C., Lord Provost John Phin, Miss Bailie Violet Roberton, Prof. Thomas Murray Taylor, LL.B., and Mr. Aidan Gordon Wemyss Thomson. The terms of reference were: To inquire into the existing law of Scotland relating to:—

(*a*) The certification, detention, and supervision of persons who are, or are alleged to be, of unsound mind.

(*b*) The temporary or permanent release of such persons.

(*c*) The arrangements made for persons who have not been certified but who are suffering from mental illness, including the powers and duties of local authorities with respect thereto.

(*d*) The procedure followed in the case of lunatics who are dangerous or are alleged to be dangerous.

(*e*) The procedure followed in the case of mental defectives accused of criminal offences.

(*f*) The definition of mental deficiency.

(*g*) The arrangements for dealing with mental defectives up to the age of sixteen who are not in attendance at school, and for dealing with mental defectives on attaining the age of sixteen.

(*h*) The procedure followed in the case of mental defectives becoming temporarily insane; and to report what amendments, if any, are desirable as a preliminary step to the consolidation of the law of Scotland relating to lunacy and mental deficiency.

Parliamentary Group of the Empire Rheumatism Council

On Feb. 17th Sir FRANCIS FREMANTLE, Dr. SALTER, and Dr. HOWITT, members of the Parliamentary Medical Committee, invited members of both houses to hear Lord HORDER and Sir FRANK FOX explain the work of the Empire Rheumatism Council. Lord HORDER claimed that rheumatic disease to-day was a scourge possessing both national and imperial importance. It was an economic and a sociological as well as a medical problem. Rheumatism cost the nation several million days of incapacity from occupation on the part of the workers and some £17,000,000 per annum in sick pay and wages; all this apart from the demoralising effect of pain and suffering. He had to confess that medicine was greatly in arrears in surveying the field and still more in assaying causative factors and determining the indications for treatment. It was a serious gap in our national health defence which the Empire Rheumatism Council was now trying to fill. Fourteen years ago the Ministry of Health showed that rheumatism accounted for one-sixth of the total illness of the community; there was no reason to believe that this figure had been reduced. The Council proposed to survey the position not only in this country but in the Dominions, from which help was already coming in. Some old fallacies were being exposed; in Australia, for example, despite its sunny and dry climate, there appeared to be as much rheumatism as in this generally despised climate of ours. The climatic factor in causation had probably been over-estimated. Climatic and environmental factors seemed likely to be determining rather than primary or essential factors. It was these essential causes that so far had eluded us and needed painstaking research to track down, but we did know many potential factors in the production of rheumatism. Quite as difficult was the proper segregation of cases so that the specific causative factors might be attached to the particular types of disease. Side by side with this double task of searching for causes and segregating types, the Council proposed an intensive inquiry into all the accepted methods of treatment at present followed. Other departments of the State had shown confidence in the efforts of the Council. He was now seeking to enlist

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A. A. McNeight, Lieut.-Colonel R. N. Khosla, Captain G. K. Graham, Captain M. M. Mansfield, Captain V. M. Albuquerque, Captain M. G. Leane, Captain R. B. Davis, Temp. Captain Beharilal Kapur, Assistant Surgeon D. J. Upshon, Assistant Surgeon M. C. St. J. Condillac, and G. D. Singh.

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the aid of a representative Parliamentary group to help in the education of the public and especially of the leaders of the great industrial organisations. Any member of either house who joined the Parliamentary group would be invited to become a member of the Council.

Sir Alan Anderson, M.P., Sir Patrick Hannon M.P., the Earl of Scarbrough, Sir William Willcox, Dr. Mervyn Gordon, Dr. W. S. C. Copeman, and Sir Frank Fox then spoke briefly, and Sir Francis Fremantle endorsed Lord Horder's hope that many influential lay members of both houses would assist the work of the Council.

Housing and Public Health

In the House of Commons on Feb. 15th Sir KINGSLEY WOOD, the Minister of Health, moved the second reading of the Housing (Financial Provisions) Bill. He said that the Bill was designed to further slum clearance and abate overcrowding, and it also made provision for agricultural housing and for exceptional conditions in small urban areas. The slum clearance programme covered about 400,000 houses, and some 800,000 persons had passed from slums to new and good housing conditions. Others would be dealt with at an average rate of 25,000 a month. Local authorities had been very active in slum clearance. Some 17,000 new houses had been built or approved for the abatement of overcrowding, and one of the principal objects of this Bill was to encourage further efforts in that direction. It was estimated that for the execution of the present programme some 600,000 new houses were required—400,000 for slum clearance and 200,000 for the abatement of overcrowding. About 200,000 houses had already been built and 70,000 were under construction, while houses were being completed at a rate of about 7000 a month. (Cheers.) The same high rate would be maintained during the present year. In the last three months 22,000 houses had been approved, and the December figure of 8742 was the highest since August, 1935. Local authorities had built no less than a million houses since the Armistice. The 400,000 houses still needed would take five or six years to complete. It was the policy of the Government to concentrate Exchequer assistance in urban districts upon houses required for slum clearance and overcrowding which constituted a primary health problem. There were indications that building costs had now reached a peak and would steadily decline.

The arrangements for subsidies in the present Bill would apply to houses completed after Dec. 31st, 1938, and provision had been made for the transitional period. It was proposed to fix the subsidies for slum clearance and overcrowding at the same level. Another important alteration was that the contribution would take the form of an annual payment for 40 years. The uniform subsidy would enable local authorities to let houses at practically the same rates as were contemplated when the subsidy was fixed in 1930. The Bill would help to improve the living conditions of agricultural workers by enabling cottages to be provided at rents from 3*s*. to 4*s*. a week. The two million people who still lived in unsatisfactory conditions would be able to obtain decent accommodation within the next few years. The Bill would help to ensure a measure of planned building for some years ahead.

Mr. ARTHUR GREENWOOD moved an amendment regretting that a Bill had been introduced which would result in higher rents, which substantially reduced the amount of State assistance in respect of slum clearance, abandoned the sound principle of basing the subsidy upon the number of persons rehoused, and revived the objectionable policy of subsidising private enterprise in circumstances which would perpetuate the evil system of the tied cottage in rural areas. Sir P. HARRIS thought that overcrowding was a far more urgent problem than slum clearance and that the subsidy should be per room instead of per house. Mr. CLEMENT DAVIES said that in the course of an inquiry into the incidence of tuberculosis in Wales, he had been greatly impressed by the evidence of medical officers of health and others with regard to bad housing in rural areas. Mr. HERBERT MORRISON said that this Bill would not wipe away the evils of slums and overcrowding but would increase the financial difficulties of the local authorities, slow down the process of slum clearance and hand out subsidies to landlords. Mr. BERNAYS, Parliamentary Secretary to the Ministry of Health, replying to the debate, said that in no sphere of public policy had the National Government been more conspicuously successful than in housing.

The Labour Party's amendment was negatived by 258 votes to 137 and the Bill was read a second time.

On Feb. 17th Sir KINGSLEY WOOD, in moving the financial resolution in connexion with the Bill, said that the main subsidies authorised by it were £5 to £10 per house for slum clearance and overcrowding generally, and £10 for housing of the agricultural population. Additional sums would be allowed in special cases.

The resolution was agreed to by 169 votes to 127.

National Health Insurance Bill

On Feb. 17th Sir KINGSLEY WOOD moved the second reading of the National Health Insurance (Amendment) Bill. He said that the necessity for it arose from a recent judgment of the High Court on the effect of Section 2 (2) of the National Health Insurance Act, 1936, which was formerly Section 10 of the Act of 1935. Before 1935 it was possible for the owner of a business to qualify for an old-age pension on a short period of insurance by transferring the business to a relative and becoming an employee. The section was designed to prevent this "family employment" insurance but it did not say that such employment was not to be employment within the meaning of the Act. The High Court judgment denied to these people certain rights which normally follow cessation of employment, particularly the free insurance period of 18 to 24 months and the right to become insured as a voluntary contributor. The Bill proposed to add family employment to the list of employments which were exempted from compulsory insurance. It also enabled the Minister to reconsider claims for pensions which had failed on this construction of the provisions with regard to family employment and award a pension retrospectively where a claim would have succeeded on the basis of the new wording of the section.

The Bill was read a second time.

In the House of Lords on Feb. 17th, the Middlesex Hospital Bill and the Poor Law Amendment (No. 2) Bill were read a second time, and on Feb. 22nd the Population (Statistics) Bill and the Blind Persons Bill, which have passed the Commons, were read a first time.

QUESTION TIME

WEDNESDAY, FEB. 16TH

"S.O.S." or "M'aider"

Mr. MAGNAY asked the Postmaster General if he was aware that naval and merchant shipping interests resented the misuse of the signal of distress at sea, S.O.S., by the British Broadcasting Corporation and other commentators, including newspapers; and whether he would ask the British Broadcasting Corporation to substitute another designation for its urgent messages to relatives of sick persons.—Major TRYON replied: I am not aware of any resentment against the use by the British Broadcasting Corporation of the designation S.O.S. for urgent broadcast messages to relatives of sick persons. I am informed by the Corporation that such messages have been so designated since 1924 without complaint from any quarter. I understand that by international agreement "M'aider" and not "S.O.S." is used by ships and aircraft for *spoken* signals of distress. I see no adequate reason for asking the B.B.C. to alter their present practice.

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THURSDAY, FEB. 17TH

Malnutrition in South Wales

Mr. MAINWARING asked the Minister of Labour whether his attention had been drawn to the continued increase of malnutrition amongst juveniles attending instruction centres situate in Rhondda, in that out of 226 girls examined at the Ynyswen centre 42·5 were certified as requiring additional nourishment, of 128 boys examined at the Trealaw centre 43·4 and of 172 boys at Pontygwarth 24·4 were respectively certified; and whether, in view of the facts disclosed, he was prepared to authorise the provision of a midday meal for those attending.—Mr. ERNEST BROWN replied: I am aware that the latest figures of juveniles in attendance at the three Junior Instruction Centres conducted by the Rhondda Local Education Authority who have been certified as in need of supplementary nourishment have shown an increase on earlier figures. Under the legislation now before Parliament, it will be open to the Rhondda Authority to make proposals for the provision of meals in their centres.

School Meals in Secondary Schools

Mr. GEORGE GRIFFITHS asked the Parliamentary Secretary to the Board of Education whether he could now supply the information on school meals in secondary schools to which he referred in reply to a similar question on July 29th, 1937.—Mr. KENNETH LINDSAY replied: The returns mentioned in my reply of July 26th last have now been summarised, and show that all except 9 of the 133 local education authorities for higher education which provide secondary schools make some provision for school meals, and that in two of the remaining cases the matter is under consideration. In all the grant-earning secondary schools in England and Wales, including schools provided or aided by local education authorities, and some schools which are not aided, the number of pupils (other than boarders) who normally take dinner at school is returned as 85,855. Of these 11,770 receive free dinners for which no cash payment is made, but in addition the parents of many pupils receive maintenance allowances which are intended to cover the whole or part of the cost of school dinners.

Voluntary Mental Patients

Mrs. TATE asked the Minister of Health the number of voluntary patients applying for treatment at public mental hospitals in each year since the passing of the Mental Treatment Act, 1930; and the number of these patients who were subsequently certified.—Sir KINGSLEY WOOD replied: The following are the statistics relating to voluntary patients:—

Year	Admissions	Subsequently certified
1931	1495	65
1932	2295	108
1933	2961	131
1934	4078	129
1935	5834	181
1936	6904	177

Figures for 1937 are not yet available.

Typhoid Outbreak in Somerset

Sir FRANCIS FREMANTLE asked the Minister of Health the number of cases and deaths hitherto notified in the present outbreak of typhoid fever in the county of Somerset; and whether the cause had now been traced.—Sir KINGSLEY WOOD replied: Thirty-nine cases of which the last ten are secondary have been confirmed, and 6 I regret to say were fatal. The cause of the outbreak has not yet been determined. I will let my hon. friend know when he can put down another question on this point.

Chinese Liquid Eggs

Lieut.-Colonel ACLAND-TROYTE asked the Minister of Health whether his attention had been drawn to the report of the county medical officer of Somerset that typhoid fever could be conveyed by eggs; and whether he would prohibit the importation of Chinese liquid eggs to prevent the risk of infection from this source.—Sir KINGSLEY WOOD replied: I am not aware of the report mentioned in the question. I have seen a statement in the press, attributed to an unnamed doctor, that ducks' eggs may transmit typhoid bacilli, but I am advised that there is no evidence to this effect. I see no reason, therefore, for the steps suggested in the second part of the question, especially as laboratory examinations of Chinese eggs have not revealed the presence of any disease-producing organisms.

Hospitals and Price of Milk

Mr. LATHAN asked the Minister of Agriculture, if his attention had been called to the serious difficulties for large consumers of milk, like hospitals, which had arisen from the regulations and fixed prices of the Milk Marketing Board; whether he was aware that in the case of the Sheffield Royal Hospital the average price per gallons had risen since September, 1933, from 1*s.* to 1*s.* 5½*d.*, and that on a smaller consumption the total cost had risen from £1190 to £1732; and whether any steps were contemplated to secure a reduction in the price of milk for hospitals and similar institutions.—Mr. MORRISON replied: I appreciate that large consumers of milk, such as hospitals, who derived advantage from the disorganised market conditions prevailing before the Milk Marketing Scheme came into force, have now to pay more for milk than formerly; and I would refer the hon. Member to the reply given on this subject on Nov. 22nd last.

Industrial Health Research and Rheumatism

Mr. MARKHAM asked the Minister of Health what sums were allocated yearly to the Industrial Health Research Board, and what part of these was spent on research; and whether this Board had undertaken, or encouraged financially, any researches into the causation or treatment of rheumatism and, if so, with what results.—Earl WINTERTON replied: The Industrial Health Research Board forms part of the Medical Research Council, and has no independent financial provision. The cost of the research work at present directed by the Board is approximately £9500 per annum. The programme has not included any research into rheumatism.

MONDAY, FEB 21ST

Water Engineers

Mr. RHYS DAVIES asked the Minister of Health how many local authorities employed an engineer for water purposes only covering a population of 200,000 and over; and whether, in view of the findings of the Croydon Typhoid Report, he would consider insisting that in all such cases the person responsible for the water-supply should be employed solely for that purpose.—Sir KINGSLEY WOOD replied: According to my information all such authorities, other than the Croydon Corporation, have a water engineer who is employed solely for the purpose of supervising their water-supply undertaking.

Hospitals and the Price of Milk

Mr. WILSON asked the Minister of Agriculture whether he was aware that the Sheffield Royal Hospital, which purchased large supplies of milk, paid in the year October, 1932, to September, 1933, before the Milk Marketing Board operated, an average price of 1*s.* per gallon, and that in the year October, 1936, to September, 1937, the average price paid was 1*s.* 5½*d.* per gallon; how this increase of 44 per cent. was accounted for; and what steps he was taking to reduce the price of milk to hospitals.

Mr. BOULTON asked the Minister of Agriculture if he would consider whether the cheap milk scheme as applied to schools could be extended to hospitals owing to the enhanced cost of milk, which was throwing a burden on hospitals which they were finding difficult to carry.—Mr. MORRISON replied: The Milk-in-Schools Scheme was initiated with a view to encouraging the milk drinking habit in children. Different considerations apply to the question of the price paid for milk by hospitals, as to which I would refer to the replies given on Thursday last, and on Nov. 22nd last.

Mr. BOULTON asked if the Minister did not think that the hospitals were receiving somewhat exceptional treatment and if he would consider some other method.

Mr. Morrison said that at present the hospitals were getting milk at wholesale rates. He did not see why producers of milk should supply milk below cost price any more than those who supplied bandages should do so.

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Replying to further questions, Mr. MORRISON said he was not aware of the statement that had been published that the cost of milk to hospitals had now gone up by £400,000 a year. If there had been an increase in the cost of milk to hospitals, it should be compared with the price charged at the time when the whole industry was in a state of collapse, and if it had not been for the action of the Milk Board there would have been a serious shortage of milk in this country.

TUESDAY, FEB. 22ND

Miners' Nystagmus

Mr. DAVID ADAMS asked the Secretary for Mines the extent to which men partially incapacitated by miners' nystagmus were provided with light work on the surface or underground, respectively, in the collieries of County Durham for the year ended September, 1937, or other convenient date.—Captain CROOKSHANK replied: The latest available information, which relates to September, 1936, is contained in Table D, on page 48, of the report of the Home Office departmental committee on certain questions arising under the Workmen's Compensation Acts, which has just been published—Command Paper No. 5657.

Maternity Services in Scotland

Mr. WESTWOOD asked the Secretary of State for Scotland if he was yet in a position to state the result of the negotiations with the family medical practitioners of Scotland for service to be rendered under the Maternity Services (Scotland) Act, 1937.—Mr. ELLIOT replied: Yes, Sir. Agreement has been reached with the Scottish Committee of the British Medical Association as to the revised terms of remuneration which they are prepared to recommend for acceptance by members of the Association for medical services under the Maternity Services (Scotland) Act, 1937. It has been agreed that the basic fee should be 40*s*. per case for all attendances during pregnancy, labour and the lying-in period, including antenatal examinations and a postnatal examination. Insured women are entitled to certain antenatal services under the National Health Insurance scheme, and accordingly it has been agreed that in these cases the basic fee should be 36*s*. The terms will be subject to review at the end of an experimental period of two years. The Department of Health for Scotland are arranging to issue a circular to local authorities as soon as some minor points still outstanding are settled. Mr. Elliot added that there would be some arrangement between the local authorities and the medical practitioners to give effect to the scheme.

Silicosis in South Wales

Mr. JAMES GRIFFITHS asked the Chancellor of the Duchy of Lancaster, as representing the Lord President of the Council, what progress had been made with the investigation into the problem of silicosis at the Ammanford colliery, South Wales; whether it was proposed to extend the investigation to other collieries in the anthracite coalfield; and if he could give some indication as to when the investigations would be completed.—Earl WINTERTON replied: Following the closure of the pit originally selected by the special committee of the Medical Research Council, the investigation into chronic pulmonary disease among coal-miners was transferred to Ammanford early in December and satisfactory progress is being made there both in the medical and in the environmental inquiries. The work at this colliery will probably be completed about the end of March, after which some time will have to be given to a study of the information collected. It is proposed thereafter to extend the investigation to another anthracite colliery, but the selection of a pit will depend on the results of the work at present being done. It is not yet possible to indicate any date for the completion of the investigations as a whole.

Physical Training in Scotland

Sir SAMUEL CHAPMAN asked the Secretary of State for Scotland if he was aware that, in many schools under the local education authorities in Scotland, there already existed gymnasia, swimming-baths, and playing fields which, although used for day and evening school purposes, were free at times when they might be made available for adults and adolescents on payment by the grants committee; and, in places where such facilities did not already exist, would he endeavour to arrange for their provision jointly between the education committees and the National Advisory Council.—Mr. ELLIOT replied: I am aware that gymnasiums, swimming-baths, and playing fields have been provided by many education authorities. The attention of all education authorities has recently been drawn to their powers in this connexion, and to the desirability of making such facilities available for use by voluntary organisations at times when they are not required for school or continuation class use. I am glad to say that increasing use is being made of school premises for these purposes.

Stockton-on-Tees and Nutrition Inquiry

Captain ELLISTON asked the Minister of Health whether he was aware that the town council of Stockton-on-Tees had refused facilities for their medical officer of health to assist the Ministry in the investigation of nutrition problems; and whether such assistance would involve long or frequent absence from local duties.—Sir KINGSLEY WOOD replied: I have been in communication with the town council who have informed me that they very much regret that it is not in present circumstances possible for them to release their medical officer of health, who is a full-time officer of the corporation, to undertake this proposed investigation. The investigation would entail about one day per fortnight for one year.

MEDICAL NEWS

University of Cambridge

On Feb. 19th the following degrees were conferred:—

M.B., B.Chir.—*S. B. Darbishire, *E. B. Hacking, *Morvyn Williams, L. H. Cane, H. G. W. Hoare, J. M. G. Wilson, Geoffrey Sheers, and R. M. Miller.

M.B.—*S. A. Propert, *G. L. Foss, and R. E. Rodgers.

* By proxy.

The Colonial Office

The Secretary of State for the Colonies has appointed Dr. A. J. R. O'Brien, C.M.G., assistant medical adviser in the Colonial Office, to be his chief medical adviser in succession to the late Sir Thomas Stanton.

Dr. O'Brien who is 55 years of age graduated at Edinburgh in 1905. Four years later he obtained the D.P.H. and B.Hy. at Durham and in 1911 he was appointed to the West African Medical Staff and served as medical officer and medical officer of health in the Gold Coast. During the late war he saw active service in both West and East Africa, and was awarded the Military Cross and bar. In 1922 he was appointed specialist in surgery in the Gold Coast and held that post until September, 1929, when he retired. He then paid an official visit to the West Indies to advise upon public health questions. In June, 1930, he was appointed medical secretary to the Colonial Advisory Medical and Sanitary Committee, and in 1933 his appointment became that of assistant medical adviser in the Colonial Office.

Medical Research in Canada

It is announced that a National Medical Research Committee has been formed in Canada with Sir Frederick Banting, F.R.S., as chairman.

Third International Cancer Congress

This congress will be held in September, 1939, in the United States under the auspices of the International Union against Cancer. The president of the congress will be Prof. Francis Carter Wood, director of the Institute of Cancer Research of Columbia University, New York City; the secretary-treasurer is to be Dr. Donald S. Childs of Syracuse, New York; and Dr. A. L. Loomis Bell of Long Island College Hospital, Brooklyn, New York, will be in charge of transportation and exhibits. The proposed sections are as follows: general research; biophysics; genetics; general pathology of cancer; surgery of cancer; radiological diagnosis of cancer; radiotherapy of cancer; statistics; and education. The place of the congress will be the Haddon Hall Hotel, Atlantic City, New Jersey, the date Sept. 11th to 16th, and the membership fee will be $15. All inquiries should be addressed to the Institute of Cancer Research, 1145, Amsterdam-avenue, New York, N.Y.

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University of London

At 5 P.M. on Tuesday, March 15th, at University College, Gower-street, W.C., Dr. A. P. H. A. De Kleijn, professor of rhinology, laryngology, and otology in the University of Amsterdam, will lecture on vestibular physiology.

University of St. Andrews

Mr. H. Gordon Campbell, L.R.C.S., L.D.S., has been appointed to the university chair of dentistry recently founded with a gift of £17,500 from Mr. William Boyd, chairman of the Dundee Dental Hospital. Mr. Campbell is lecturer in dental anatomy at the Dundee Dental School.

University of Leeds

Dr. M. J. McGrath, medical superintendent of the West Riding Mental Hospital, has been appointed lecturer in mental diseases in the university.

Medical Society of London

The 163rd anniversary dinner of this society will be held at Claridge's Hotel, London, W., on Tuesday, March 1st, at 7.45 P.M.

Royal Sanitary Institute

Lord Horder will deliver an address, on human reactions to noise, at a meeting of the institute which is to be held on Tuesday, March 8th, at 5.30 P.M., at 90, Buckingham Palace-road, London, S.W.1.

Industrial Eyestrain

Special measures for avoiding eyestrain in processes that need fine or close work are recommended in a pamphlet issued by the Factory Department of the Home Office (Form No. 1983, H.M. Stationery Office, 1937, 1*d*.). The chief means suggested are adequate and suitable glare-free lighting, the correction of refractive errors, and the use of magnifying optical devices. There are also notes on the prescription and wearing of spectacles for fine work.

Demonstrations of Contraceptive Technique

On Thursday, March 3rd, at 2.30 P.M., at the C.B.C. Clinic, a practical demonstration of the technique of the use of a variety of contraceptive methods will be given by Mrs. Marie Stopes, D.Sc., and Dr. Evelyn Fisher. Medical practitioners and senior students should apply for tickets to the hon. secretary, C.B.C., 108, Whitfield-street, London, W.1.

London School of Hygiene and Tropical Medicine

The annual malaria-control course for laymen will be held at the school (Keppel-street, W.C.) from June 27th to July 1st under the direction of Sir Malcolm Watson. Additional lectures have also been arranged on water-supplies, conservancy and sewage-disposal, insulation against heat and cold, and air-conditioning for comfort in the tropics. Further particulars may be had from the organising secretary of the Ross Institute of Tropical Hygiene at the school.

International Conference on Goitre

The American Association for the Study of Goitre announces that the third International Goitre Conference will meet at Washington from Sept. 12th to 14th. The principal subjects for discussion will be endemic goitre, cretinism, and myxœdema; the thyroid in relation to metabolism, nutrition, and endocrine glands; and hyperthyroidism. Dr. Allen Graham, 2020, East 93rd-street, Cleveland, Ohio, is chairman of the programme committee.

Tuberculosis Hospital in Buenos Aires

One of the largest tuberculosis hospitals in the world is shortly to be inaugurated in Buenos Aires. The government has made a grant of 3,000,000 pesos (about £200,000) for its erection and of 1,000,000 pesos (£66,000) a year for its upkeep. The building is to have 14 storeys and it stands on a 15-acre site near the centre of the city which is to be planted with pine, eucalyptus, and other trees with medicinal qualities. It will be equipped for the treatment of 1200 in-patients. It will also have facilities for research and will be the headquarters of a national antituberculosis campaign.

Order of the Nile

The King has given permission to Prof. C. A. Bentley to wear the insignia of commander of the Order of the Nile, which has been conferred upon him by the King of Egypt in recognition of his services.

Course of Child Psychology

A vacation course on child psychology will be held from April 20th to 25th at Southlands Training College, Wimbledon Park Side, S.W. This course will be given in two concurrent sections: one for matrons of schools, and one for school medical officers and teachers. Further particulars can be had from the secretary of the Child Guidance Council, Woburn House, Upper Woburn-place, London, W.C.1.

Committee against Malnutrition

A public meeting will be held by this committee on Thursday, March 3rd, at 8 P.M., at the Royal Society of Arts, 18, John-street, Adelphi, W.C. Prof. V. H. Mottram will be in the chair, and Prof. W. E. Le Gros Clark, Dr. Janet Vaughan, Miss Marjorie Green, and Prof. J. R. Marrack will speak on The Path of National Fitness. Tickets may be had from the hon. secretary of the committee, 19c, Eagle-street, London, W.C.1.

Hunterian Society

The annual banquet of this society, to celebrate the 210th anniversary of the birth of John Hunter, was held at the May Fair Hotel, London, on Feb. 17th, with Dr. D. C. Norris, the president, in the chair; some 250 fellows and guests were present. After the loyal toast had been duly honoured Lord Snell, chairman of the London County Council, proposed the health of the society. The president replied to the toast and presented the society's gold medal to Dr. John Wilson Reid, of Beaumaris, Anglesey, for the winning essay of the year on the Prognosis and Care of Heart Disease in General Practice. The toast of The Visitors and Kindred Societies was given by Mr. Alex E. Roche, and responded to by Judge Earengey, K.C., Sir John Stavridi, and Mr. Hugh Lett. Entertainment was provided by Giovanni.

Society of Radiographers

At the seventeenth annual dinner of this society, held at Frascati's, London, on Feb. 19th, there was a record attendance of some 210 members and guests—so many that a part of the company had to dine in an adjoining room. Mr. G. W. C. Kaye, D.Sc., who presided, proposed The Guests. Mr. C. Thurstan Holland, F.R.C.S., responding, gave an account of his early days as a pioneer in the use of X rays. When he was radiologist to the Royal Southern Hospital, Liverpool, from 1896 to 1904, he had to be also his own radiographer. He had his first real assistant when he worked at the Royal Infirmary, and had then formed a high opinion of radiographers which he had never had occasion to change. Mr. Cuthbert Andrews, proposing the toast of The Society, said that since its foundation 16 years ago there had been many changes in the status of radiographers. Before then they had been entirely unorganised, without special education or qualifications, or opportunity to express their views. They had no fixed five-day week or month's holiday, no blood counts to protect them from danger, and no salary to speak of. Now they were united, strong, and growing, an essential part of the British Institute of Radiology. They had a home, a library, a practical room, and their own journal. They must not under-rate their privileges in belonging to the institute, which in its turn appreciated the value of their close coöperation. Dr. Kaye, in reply, said that the society had grown steadily until at present it numbered over 1100. The qualification M.S.R. was now a synonym for efficiency. Recognition by the Board of Registration of Medical Auxiliaries had been a great step forward. The society had four branches—South-West, Scottish, Johannesburg, and Melbourne—and there was a friendly spirit between these and the provincial societies who might one day he hoped come into the fold. Dr. Kaye then presented the Sir Archibald Reid memorial medal to Miss A. M. V. Ash, M.S.R., and the medal for the Stanley Melville memorial lecture to Mr. H. T. Ferrier, F.S.R. A presentation was also made to Mr. F. Melville in recognition of his services as secretary of the society.

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University of Wales

During the session 1938–39 a Mrs. John Nixon scholarship (value £150), a Lord Merthyr scholarship (value £200), and a Ewen Maclean scholarship (value £150) will be available. Further particulars may be had from the registrar, University Registry, Cathays Park, Cardiff.

Ophthalmic Medical Practitioners' Group

The third meeting of this group will be held at 18, Russell-square, London, W.C.1, on March 5th at 3 P.M. The full agenda will be sent on application to the hon. secretary of the group at 100 Greyhound-lane, London, S.W.16.

Royal Society of Medicine

A reception will be held by the president and officers of this society at 1, Wimpole-street, London, W., at 8.30 P.M., on Wednesday, March 16th, when Mr. F. J. Osborn will lecture on garden cities and town planning.

Congress for Digestive and Metabolic Disorders

The fourteenth congress of the Gesellschaft für Verdauungs- und Stoffwechselkrankheiten will be held at Stuttgart from Sept. 22nd to 24th. Prof. Grafe (Würzburg) will preside and the principal subjects for discussion will be lipoidosis, glycogen storage disease, modern insulin treatment, pancreatitis, and gastro-intestinal auto-intoxication. Further information may be had from Prof. H. von Hoesslin, Fasanenestr. 27, Berlin W. 15.

Society of Apothecaries of London

At Tuesday's livery dinner Sir StClair Thomson proposed the toast of The Society and recalled that on Sept. 6th, 1881, he had left the building to send a telegram: "Dearest Mother I am licensed to kill." The Society's licence had launched him on 57 very happy years of medical practice, and as a mark of his gratitude he asked the master to accept a piece of "Lambeth Delft" glazed pottery bearing the arms of the Society. The function of these slabs was doubtful; they may (though rather small) have been used for pill-rolling; they may have been given to each new freeman (but there were no records of this); or they may have been a shop sign to distinguish the apothecary from the grocer. The date must have been between 1620 when the Society obtained its arms and 1780 when the Lambeth pottery was discontinued. The coat-of-arms as represented on the slab suggested vigour and possibly even a prophetic understanding of the importance of organotherapy. Mr. Hugh Lett, the master, who agreed that the society was collectively rampant and flourishing, spoke of the promotion to the livery of Mr. W. T. Withers—a "very distinguished servant of the Society"—who had come to the Apothecaries' Hall as assistant beadle in 1887 and in the course of his devoted work had won the affection of all those who came in contact with him, including unsuccessful candidates. After making a presentation to Mr. Withers Mr. Lett referred to the new lighting of the pictures in the next room, including Reynolds's portrait of John Hunter in a beard, and mentioned the discovery by Dr. E. A. Bullmore of a memorial tablet in Wisbech to Robert Harris, a seventeenth century master of whom it was said that "he was a man who had the good heart to enjoy his plentiful share of this world's goods." Mr. L. Vernon Cargill, junior warden, proposing the health of The Guests recalled that both Sir StClair and himself had been house surgeons to Lister, in 1883 and 1890–91 respectively. Dr. G. C. Anderson, secretary of the British Medical Association, responding, said he was convinced that the medical profession should administer a corrective to the information supplied to the public on medical and sociological questions. The traditional and dignified silence might have done, and might still do, something to discredit irresponsible allusions to the work of doctors, but it did nothing to throw into relief the impracticable advice given to the people. Misconduct and censure in the profession, rather than the commoner loyalty and zeal, created news for publication. In scientific matters "the public does not appreciate what we appreciate" and in Dr. Anderson's opinion an element of the dramatic was necessary if the medical point of view was to be conveyed.

Meteorological Office

Mr. N. K. Johnson, M.Sc., has been appointed director of the Meteorological Office in succession to Sir George Simpson, F.R.S., who retires in September.

International Anthropological Congress

The second International Congress of Anthropological and Ethnological Sciences will be held at Copenhagen from August 1st to 6th under the presidency of Prof. Thomas Thomsen. Further information may be had from the hon. secretary of the congress, National Museet, 10, Ny Vestergade, Copenhagen.

Air-Raid Precautions Medical Officer

In our advertisement columns this week the Corporation of Bristol invites applications for the post of assistant medical officer of health for air-raid precautions from medical men who have received training in air-raid precautions and have knowledge of anti-gas work. The appointment will be temporary in the first instance.

Congress of Obstetrics and Gynæcology

On the occasion of its fiftieth anniversary the Dutch Gynæcological Society is organising an International Congress of Obstetrics and Gynæcology in Amsterdam from May 4th to 8th, which will be the first since the 1912, international congress in Berlin. The main subjects for discussion will be eclampsia, thrombosis and embolism, and hormones. The general secretary of the congress is Dr. F. C. van Tongeren, University Clinic of Obstetrics and Gynæcology, Wilhelminagasthuis, Amsterdam, W.

The Mortality from Tuberculosis

Mr. Herwald Ramsbotham, the Minister of Pensions, speaking in support of the national health campaign at Preston last week spoke of the great importance of early treatment both for tuberculosis and for venereal disease. Each year, he said, the names of between 13,000 and 14,000 persons were removed from the registers of the tuberculosis dispensaries as having recovered, but an even greater number were written off as having died, and in almost all these cases medical advice was sought when it was too late. Last year nearly five times as many people were killed by tuberculosis as were killed on the roads.

Tuberculosis Association

This association will hold its provincial meeting at the Dunn Laboratories, Oxford, on April 7th, 8th, and 9th, under the presidency of Dr. S. R. Gloyne. On the first day Dr. Heimbeck (Oslo), Dr. H. H. Bashford, Dr. Campbell Faill, and Miss G. M. Bowes (matron of the Birmingham Hospital Centre) will read papers on the incidence of tuberculosis in young adult women with special reference to employment, and Prof. G. R. Girdlestone and Dr. W. Stobie will discuss problem cases. On the following day Mr. R. C. Brock and Mr. T. Holmes Sellors will speak on extrapleural pneumothorax, and Dr. G. C. Williams, Dr. H. G. Trayer, Dr. F. H. Young, Dr. Neville Irvine, and Dr. A. M. Cooke on what can be done to prevent the tuberculous patient relapsing. At the last session Dr. Felix Fleischner (Vienna) and Dr. A. E. Barclay will be among the openers of a discussion on the progress of radiology. Further information may be had from Dr. N. England, 1, Becket-street, Oxford.

NURSING HOMES, 1938.—Messrs. Benn Brothers (Bouverie House, Fleet-street, London, E.C.4) have sent us a copy of the eighth edition of their directory of registered nursing and convalescent homes in England, Wales, and Scotland. The list is arranged topographically, and under each town is found the names, addresses, and telephone numbers of its nursing-homes with their appropriate descriptions (med., surg., mat., or conv.). Homes which supply nurses for outside work are indicated with an asterisk. It would be a gain if in later editions a note of the number of beds available at each home could be added. The book contains 273 pages and costs 3s. 6d.

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Medical Diary

February 28th to March 5th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY.

Odontology. 8 P.M., Mr. R. E. Rix: The Relationship of Pre-normal Occlusion to the Early Loss of Deciduous Molars. Mr. G. T. Hankey: Three Unusual Tumours.

TUESDAY.

Orthopædics. 5.30 P.M. (Cases at 4.30 P.M.). Mr. D. McCrae Aitken: The Robertson Lavalle Operation for Tuberculous Joints. Mr. H. Jackson Burrows: (1) Osteoclastoma of the Upper End of the Femur. Mr. A. T. Fripp: (2) Ununited Fracture of the Tibia. Mr. John Bastow: (3) Brodie's Abscess of Head of Tibia. (4–5) Spontaneous Dislocation of the Cervical Spine in Children. Mr. G. O. Tippett: (6) Excision of Patella for Fracture, (7) Excision of Patella for Osteoarthritis, (8) Osteochondritis of the Ischio-pubic Bones.

Pathology. 8 15 for 8.30 P.M., Laboratory meeting at the London Hospital, E.

WEDNESDAY.

History of Medicine. 5 P.M., Sir StClair Thomson: Enamel Miniatures of Sir Théodore Turquet de Mayerne (1573–1655) and of Dr. Richard Mead (1673–1754). Capt. P. J. Johnston-Saint: A Historical Survey of Faith Healing.

Surgery, Medicine, Anæsthetics. 8.30 P.M., Mr. C. Price Thomas, Dr. J. Maxwell, and Dr. E. H. Rink: Massive Collapse of the Lung as a Complication of Surgical Operations.

FRIDAY.

Otology. 10.30 A.M. (Cases at 9.30 A.M.). Mr. Lionel Colledge and Mr. Douglas Crow: Lateral Sinus Thrombosis and Its Treatment.

Laryngology. 5 P.M. (Cases at 4 P.M.). Mr. A. M. Zamora and Mr. H. V. Forster: Physical Methods in Suppurative Conditions of the Nose and Throat.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.

MONDAY.—8.30 P.M., Prof. Henry Cohen and Mr. C. W. G. Bryan: The Causes and Treatment of Flatulence.

WEDNESDAY.—9 P.M., Dr. George Graham: A Survey of the Changes and Results of Treatment of Diabetes in the Last 15 Years. (Second Lettsomian lecture.)

HUNTERIAN SOCIETY.

MONDAY.—9 P.M. (Mansion House, E.C.), Sir Frederick Hobday: John Hunter—Pioneer of Veterinary Science.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

FRIDAY.—8.30 P.M. (West London Hospital, W.), Dr. Donald Hunter: Industrial Diseases.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.

TUESDAY.—5 P.M., Dr. B. E. Schlesinger: The Public Health Aspect of Heart Disease in Childhood. (Last Milroy lecture.)

THURSDAY.—5 P.M., Dr. C. C. Ungley: Some Deficiencies of Nutrition and their Relation to Disease. (First Goulstonian lecture.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's-Inn-fields, W.C.

MONDAY.—5 P.M., Dr. L. W. Proger: demonstration of new museum specimens.

FRIDAY.—5 P.M., Dr. A. J. E. Cave: Anatomy of the Tongue.

UNIVERSITY OF BIRMINGHAM.

THURSDAY.—4 P.M., Prof. F. R. Fraser: Clinical Applications of Chemical Transmission by Acetylcholine.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland-place, W.

WEDNESDAY.—3.30 P.M., Dr. R. Cove-Smith: The Use and Abuse of Physical Training.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.

WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Dr. J. G. Scadding: Respiratory Function in Disease (1). 3 P.M.: clinical and pathological conference (surgical) 4.30 P.M., Dr. Dorothy Russell: Tumours of the Central Nervous System and Meninges.

THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration. 2.30 P.M., Mr. L. R. Broster: Surgical Application of Endocrinology with Special Reference to the Adrenal Glands. 3.30 P.M., Mr. A. S. Parkes, F.R.S.: The Female Sex Hormones.

FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology).

Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

NATIONAL HOSPITAL, Queen-square, W.C.

MONDAY.—3.30 P.M., Dr. C. P. Symonds: Cerebral Tumours (1).

TUESDAY.—3.30 P.M., Dr. Grainger Stewart: Spinal Compression.

WEDNESDAY.—3.30 P.M., Dr. F. M. R. Walshe: clinical demonstration.

THURSDAY.—3.30 P.M., Dr. C. Hinds Howell: Poliomyelitis.

FRIDAY.—3.30 P.M., Dr. J. St. C. Elkington: Acute Infectious Disease of the Brain.

Out-patient clinic daily at 2 P.M.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY.

2 P.M., Dr. R. S. Frew: Cœliac Disease. 3 P.M., Mr. A. Simpson-Smith: Neonatal Abdominal Emergencies.

Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

ST. GEORGE'S HOSPITAL, S.W.

THURSDAY.—5 P.M., Dr. Antony Feiling: neurological demonstration.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

FRIDAY.—4 P.M., Mr. W. G. Scott-Brown: Allergy.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL.

WEDNESDAY.—4 P.M., Dr. H. V. Morlock: The Treatment of Some Acute Respiratory Conditions.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY to SATURDAY.—ROYAL WATERLOO HOSPITAL, Waterloo-road, S.E., all-day course in medicine, surgery, and gynæcology.—F.R.C.S. (PRIMARY) COURSE IN PHYSIOLOGY, Mond., Wed., and Fri. at 5.30 P.M.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W., Tues. and Thurs., at 8 P.M., M.R.C.P. clinical and pathological course.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.

FRIDAY.—4.30 P.M., Dr. Francis Bach: Physical Medicine in Diseases of the Cardiovascular System.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, S.W.

WEDNESDAY.—4 P.M., Mr. E. G. Muir: Some Minor Disorders of the Rectum.

LEEDS GENERAL INFIRMARY.

TUESDAY.—3.30 P.M. (at the Maternity Hospital), Mr. D. W. Currie: demonstration of obstetric cases.

MANCHESTER ROYAL INFIRMARY.

FRIDAY.—4.15 P.M., Mr. A. Graham Bryce: post-graduate demonstration.

ANCOATS HOSPITAL, Manchester.

THURSDAY.—4.15 P.M., Dr. G. J. Langley: Coronary Occlusion.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.

WEDNESDAY.—4.15 P.M. (Western Infirmary), Mr. W. W. Galbraith: Urological Cases.

Vacancies

For further information refer to the advertisement columns

Aberdeen City.—Regional M.O. for Maternity and Child Welfare, £850.

Albert Dock Hosp., Connaught-road, E.—Res. M.O., at rate of £110.

Birmingham Children's Hosp.—Res. M.O., £175.

Birmingham City.—Temp. M.O. to Maternity and Child Welfare Dept., £10 per week.

Birmingham, Coleshill Hall.—Deputy Med. Supt., £500.

Birmingham, Royal Cripples Hosp.—Res. H.S., at rate of £200.

Bradford Children's Hosp.—H.P., £150.

Bradford, Municipal General Hosp., St. Luke's.—H.P.'s and H.S.'s, each at rate of £150.

Brighton County Borough Mental Hosp., Haywards Heath.—Second Asst. M.O., £500.

Bristol City and County.—Asst. M.O.H. for Air-raid Precautions, £500–£700.

Bristol Eye Hosp.—Jun. H.S., at rate of £100.

Burnley, Victoria Hosp.—H.P., at rate of £150.

Burton-on-Trent General Infirmary.—Sen. H.S., £200.

Central London Throat, Nose, and Ear Hosp., Gray's Inn-road, W.C.—Registrar and Clin. Tutor, £300. Also Third Res. H.S., at rate of £75.

Central Midwives Board, 23, Great Peter-street, S.W.—Supernumerary Examiners.

Charing Cross Hosp., W.C.—Surg. Reg., £150.

Chester City Hosp.—Jun. Res. M.O., £200.

Chesterfield and North Derbyshire Royal Hosp.—Cas. O. and Fracture H.S., at rate of £200.

Colchester, Royal Eastern Counties' Institution, &c.—Asst. M.O., £400.

Colonial Medical Service.—M.O. for Gibraltar, £600.

Coventry and Warwickshire Hosp.—Two H.S.'s to Special Dept. each £150.

Dagenham Urban District Council.—Deputy M.O.H., £600.

Derby, Bretby Hall Orthopædic Hosp.—Jun. Res. Asst. M.O., £350.

Derbyshire County Council.—Asst. County M.O.H., £700.

Derbyshire Royal Infirmary.—H.S. to Ear, Throat, and Nose Dept., £150.

Doncaster Royal Infirmary and Dispensary.—Cas. H.S., £175.

Dorset County.—Asst. County M.O. and M.O.H., £800.

Dreadnought Hosp., Greenwich.—H.P. and H.S., each at rate of £110.

Dudley, Guest Hosp.—Two H.S.'s, £100–£130.

Eastbourne, Royal Eye Hosp.—H.S., £100.

Elizabeth Garrett Anderson Hosp., Euston-road, N.W.—Two Clin. Assts. to Ophthalmic Dept., each £50.

Evelina Hosp. for Sick Children, Southwark, S.E.—Fourth Physician, 50 guineas.

Exeter, Princess Elizabeth Orthopædic Hosp.—Res. H.S., at rate of £150.

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Exeter, Royal Devon and Exeter Hosp.—Res. Surg. O., £250. Also two H.S.'s, each at rate of £150.
Guildford, Royal Surrey County Hosp.—H.S., and H.P. and Cas. O., each at rate of £150.
Harefield Sanatorium.—Jun. Res. Asst. M.O., at rate of £250.
Hertford County Hosp.—H.S., at rate of £200.
His Majesty's Colonial Service.—Government Pathologist in British Guiana, £800.
Hosp. of St. John and St. Elizabeth, 60, Grove End-road, N.W.—Asst. Phys.
Ilford, King George Hosp.—Res. Anæsthetist and H.P., at rate of £150.
Infant Welfare Centre, General Lying-in Hosp., York-road, S.E.—M.O.
King Edward Memorial Hosp., Ealing, W.—Cas. H.S., at rate of £150.
Leamington Spa, Warneford General Hosp.—Res. H.P., at rate of £150.
Leicester Royal Infirmary.—H.S. and H.P., each at rate of £125. Also Jun. Cas. O., at rate of £100.
Leigh Infirmary, Lancs.—Jun. H.S., at rate of £150.
Liverpool, David Lewis Northern Hosp.—Cas. O., at rate of £120.
London County Council.—Asst. M.O.'s, Grade I and II, £350 and £250 respectively.
London Homœopathic Hosp., Great Ormond-street, W.C.—H.P., at rate of £100.
London Lock Hosp., 283, Harrow-road, W.—Res. M.O., at rate of £175.
Maidstone, Kent County Ophthalmic and Aural Hosp.—H.S. to Ear, Nose, and Throat Dept., at rate of £250.
Maidstone, West Kent General Hosp.—H.S., £175.
Manchester, Ancoats Hosp.—Cas. O., £175. Also H.S., at rate of £100.
Manchester, Booth Hall Hosp. for Children.—Asst. M.O., at rate of £200.
Manchester, Crumpsall Hosp.—Res. Asst. M.O., at rate of £200.
Monmouthshire County Council.—Two Asst. M.O.'s, each £500.
Montrose Royal Asylum.—Third Asst. M.O., £300.
National Temperance Hosp., Hampstead-road, N.W.—Res. M.O. and Cas. O., at rate of £175 and £120 respectively.
Newark General Hosp.—Res. H.S., at rate of £175.
Northampton General Hosp.—H.S. to Ear, Nose, and Throat Dept., H.P., three H.S.'s, and two Cas. O.'s, each at rate of £150.
Norwich, Jenny Lind Hosp. for Children.—Res. M.O., £120.
Oswestry, Robert Jones and Agnes Hunt Orthopædic Hosp.—H.S., at rate of £200.
Pembroke County War Memorial Hosp.—Res. H.S., £200.
Plymouth, Prince of Wales's Hosp., Greenbank-road.—H.S., at rate of £120.
Preston, Biddulph Grange Orthopædic Hosp.—Sen. and Jun. H.S.'s, at rate of £250 and £200 respectively.
Preston Hall Sanatorium, near Maidstone.—Asst. M.O., £250.
Princess Beatrice Hosp., Earl's Court, S.W.—Cas. O. and Obstet. H.S., at rate of £120.
Princess Elizabeth of York Hosp. for Children, Shadwell, E.—H.P., at rate of £125.
Queen Mary's Hosp. for the East End, E.—Clin. Asst. to Skin Dept.
Queen's Hosp. for Children, Hackney-road, E.—H.P. and Ear, Nose, and Throat H.S., each at rate of £100. Also Asst. Physician.
Richmond Royal Hosp., Surrey.—Res. M.O., £200. Also Sen. and Jun. H.S.'s, £150 and £100 respectively.
Rochdale Infirmary and Dispensary.—H.P., £150.
Royal Air Force Medical Service.—Commissions in Medical Branch.
Royal Cancer Hosp., Fulham-road, S.W.—Second Asst. Pathologist, £250. Also H.S., at rate of £100.
Royal Eye Hosp., St. George's-circus, S.E.—Research Assts.
Royal National Orthopædic Hosp., 234, Gt. Portland-street, W.—Two H.S.'s, each at rate of £150.
Royal Naval Medical Service.—M.O.'s.
Royal Northern Hosp., Holloway, N.—Pathological Registrar, £200. Clin. Asst. to Ear, Nose, and Throat Dept. Also H.P., at rate of £70.
Ryde, Royal Isle of Wight County Hosp.—Jun. H.S., £120.
St. Bartholomew's Hosp., E.C.—Res. Asst. Physician-Accoucheur and Demonstrator of Practical Midwifery, £1052 10*s.*
St. John's Hosp., Lewisham, S.E.—Res. Surg. O., £200.
St. Peter's Hosp. for Stone, &c., Henrietta-street, W.C.—H.S., at rate of £75.
Salford Royal Hosp.—H.P., three H.S.'s, and Cas. H.S., each at rate of £125.
Salvation Army Mothers' Hosp., Clapton, E.—Jun. Res. M.O., at rate of £80.
Sheffield Children's Hosp.—H.S., at rate of £100.
Shoreham-by-Sea, near Brighton, Southlands Hosp.—Res. Asst. M.O., £300.
South London Hosp. for Women, Clapham Common, S.W.—Clin. Assts. to Gynæcological Out-patients.
Sudan Medical Service.—Medical Inspectors £E720.
Surrey County Council.—Asst. M.O., £600.
Swansea General and Eye Hosp.—Asst. Pathologist, £500.
Tancred's Studentships.—Each £100.
Warrington Infirmary and Dispensary.—Third Resident, at rate of £150.
West London Hosp., Hammersmith, W.—H.P. and H.S., each at rate of £100.
Worcester County and City Mental Hosp., Powick.—Asst. M.O., £350.
Worcester Royal Infirmary.—Sen. and Jun. H.S., £150 and £120 respectively.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Abingdon (Berkshire), Johnstone (Renfrew), Ilkeston (Derby), Kelvedon (Essex), Reynoldston (Glamorgan), and Macclesfield (Chester).

Appointments

BONNELL, H. E., B.Sc. Wales, M.R.C.S. Eng., Hon. Pathologist to the South-Eastern Hospital for Children, Sydenham.
CLARK, A. P. C., M.D., Junior Assistant Medical Officer at Knowle Mental Hospital, Fareham.
FALLA, S. T., M.D., M.R.C.P. Lond., Assistant Physician to the Jenny Lind Hospital for Children, Norwich.
HOWELLS, G. H., M.B. Lond., F.R.C.S. Eng., Hon. Assistant Laryngologist at the British Red Cross Society's Clinic for Rheumatism, London.
MCCOMAS, H. G., M.D., M.R.C.P. Lond., Assistant Physician to the Croydon General Hospital.
MEREWETHER, H. O. M., M.B., F.R.C.S. Edin., Hon. Assistant Surgeon to the Royal Victoria Hospital, Folkestone.
PARTRIDGE, G. T., M.B. Camb., F.R.C.S. Eng., Orthopædic Surgeon at the Chester Royal Infirmary.
SEELIG, S. F., M.D. Berlin, L.R.C.P. Edin., Medical Registrar at St. John's Hospital, Lewisham.
SHAW, MARY M., M.B., Director of the V.D. Department at the Royal Free Hospital.
TAYLOR, R. H., M.B. N.U.I., Medical Registrar at St. Mary's Hospital, London.
THOMPSON, B. G., M.D. Edin., D.M.R., Radiologist at the Royal Halifax Infirmary.

Births, Marriages, and Deaths

BIRTHS

BEST.—On Feb. 16th, at Harrogate, the wife of Dr. Thos. A. Best—a daughter.
BUCKLEY.—On Feb. 20th, at Bentinck-street, the wife of Dr. John Buckley—a daughter.
FRAZER.—On Feb. 19th, at a nursing home, Hampstead, N.W., to Dr. Kathleen Frazer, wife of Dr. R. B. F. Frazer, barrister-at-law—a daughter.
KENNERLEY.—On Feb. 16th, at Rotherham, the wife of Dr. Tordiff A. S. Kennerley—a son.
O'KEEFFE.—On Feb. 21st, at Tring, the wife of Dr. C. E. O'Keeffe—a daughter.
PYPER.—On Feb. 18th, the wife of Lieut.-Colonel J. C. Pyper, O.B.E., I.M.S., Civil Surgeon, Quetta—a son.
SPALDING.—On Feb. 17th, at Bentinck-street, the wife of Mr. J. E. Spalding, F.R.C.S.—a son.

MARRIAGES

COBBE—BLAKE.—On Feb. 19th, at St. James', Sussex-gardens, Clifford J. Cobbe, M.B., to Beatrice Aileen Blake, M.B., younger daughter of Mr. and Mrs. J. A. Blake, of Petersfield, Hants.
HEAD—GRIFFIN.—On Feb. 19th, at Glasgow, Lieut.-Comdr. Henry William Head, elder son of Mr. Head, of Winchester, to Mary Alice McKechnie Griffin, M.D., elder daughter of Mr. Griffin, of Glasgow.

DEATHS

FISH.—On Feb. 15th, Richard Huxley Fish, M.D. Camb., M.R.C.P. Lond., physician to Harefield Sanatorium, aged 32.
GILBERTSON.—On Feb. 22nd, at Hitchin, James Henry Gilbertson, M.R.C.S. Eng., aged 77.
LONGMIRE.—On Feb. 15th, at Cambridge, Dr. Mary Longmire M.B. Glasg., for 30 years a missionary of the Church of England Zenana Missionary Society at Khammamett, S. India, and latterly of Norway.
LUND.—On Feb. 18th, at Pendleton, Manchester, Herbert Lund, F.R.C.S. Eng., second son of the late Edward Lund, F.R.C.S., in his 80th year.
SIMMONS.—On Feb. 22nd, Harold Simmons, M.B. Durh., 31, Wimborne-road, Bournemouth.
WHITE.—On Feb. 10th, at Strone-road, Manor Park, Essex, Sara E. White, M.B., B.Sc. Lond., in her 83rd year.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

A COMPARISON OF ANTIPYRETICS

ADAPTING Marks's "cross-test" method of physiological standardisation, G. Brownlee has compared the antipyretic activity and toxicity of phenacetin and aspirin (*Quart. J. Pharm.* 1937, 10, 609). As a result of two series of comparisons, using different doses of each drug on rats and cats, he found that aspirin has only 60 per cent. of the antipyretic activity of phenacetin. The toxicity of these two drugs given by mouth to mice was afterwards compared and found to be the same, whence Brownlee concludes that, if an antipyretic effect only is desired, phenacetin is to be preferred to aspirin.

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NOTES, COMMENTS, AND ABSTRACTS

SALERNO AND VIKING SURGERY

THE first medical school in Europe in modern times was that of Salerno, in South Italy, originally a Greek trading colony. It was founded in A.D. 846, probably by the Benedictines, but the circumstance which determined its development at that period was the happy fusion in Magna Graecia of two distinct cultural traditions, Arabian and Renaissance. The school maintained a prominent position for 500 years, reached the summit of its fame in the twelfth century, and ceased to exist only in 1811.

The attention paid to surgery at Salerno and the frequency with which surgical intervention was attempted at this early date are remarkable. The development of modern surgery may indeed be said to have begun in this school and important contributions were made to surgical knowledge. Its text-books (Roger's and the Four Masters) have been called the foundation-stones of modern surgery, and it is obvious that the authors, far from being the slaves of authority, drew their opinions from a wide experience.

In spite of the contemporary fame of the Salerno school it would appear improbable, a priori, that the Saga literature of the Viking period in the north should reflect the influence of its teaching. Nevertheless Dr. I. Reichborn-Kjennerud of Oslo, who is well known for his studies in early Scandinavian medical history, is able to demonstrate a clear relationship (*Ann. med. Hist.* 1937, 9, 321). He recalls that the school of Salerno was at its height during the first half of the Viking period; that numerous Norsemen served in the Varangian Guard at Constantinople; and that many others accompanied the Crusades or went independently on pilgrimages. He might have added, also, that although it was not until the late twelfth century that the first Norman was crowned king of the two Sicilies, yet Norman settlers had been established in Sicily, Campania, and Apulia for generations before.

Much of the surgical information embodied in the Sagas and in "Grágás," the old Icelandic law-book, which devotes a section to wounds, refers to the Scandinavian custom of *weregild*—i.e., the indemnity, in lieu of a blood feud, paid by way of redress for the slaying or wounding of another. It was the right and duty of a family to avenge the death or wounding of one of its members. The indemnity was equivalent to buying off the family revenge and ending the inevitable feud. The amount of the indemnity varied according to the rank of the persons concerned, but also, in the case of non-fatal wounds, according to the nature of the injury. Thus, a rough classification of wounds was devised in order to facilitate the calculation of fines.

The most serious injuries were those that penetrated into the brain, into a body cavity, or into the bone-marrow; wounds of the face; severance of a muscle; fractures, compound or comminuted; and wounds which required cauterisation, probably in order to arrest hæmorrhage. Wounds in the back received a double indemnity. The wounder had to pay for medical attendance, the healing fee, and provide food for a month for both the wounded man and his physician. An instrument known as *keri* was used to ascertain the depth of a wound, and Reichborn-Kjennerud shows that this word is a translation of the Middle Ages Latin *tenta*, which was probably a probe made of laminaria, and is used in the Salernitan books.

Degrees of severity were also estimated by the nature of the treatment required. For example, the indemnity was high if the patient was confined to bed. Certain serious wounds required treatment with *spik and spiaer*, an ancient technical expression which has always puzzled the commentators. Reichborn-Kjennerud has shown, however, the proper interpretation—viz., with lard and lint—from a cognate term in the Salernitan books.

Among the operations described in the Sagas is a method of opening an abscess with a red-hot iron; the treatment of fracture of the skull, involving careful removal of fragments at the time of high tide, when the brain with its membranes were supposed to bulge into the opening, and dressing the wound with "water-moss" (compare the use of sphagnum as a dressing during the late war); the secondary fracture of long bones to correct malposition; and phlebotomy. There is a description of an operation for stone in the bladder by Ravn Sveinbjörnsson about 1200. This was a urethrotomy between two ligatures, as described in Constantin's "Liber Pantegni." In 1247 an operation for hare-lip was performed in Bergen, which at that time was the seat of a bishopric which included the Isle of Man, the Hebrides, and Orkney and Shetland, all of which then belonged to Norway. It is interesting to note that Roger, by prescribing the ash of seaweed for goitre, anticipated the modern iodine treatment. Dr. Reichborn-Kjennerud gleans many other examples of Salernitan influence from the surgical practice revealed in Saga literature, a source that until now has remained unexplored by medical historians.

IMMUNITY REACTIONS OF VIRUSES

ANYONE familiar with the literature of viruses is aware of the prominent part that F. M. Burnet has taken in the research of recent years. He has been particularly interested in the reactions of viruses and their antisera, and both in this country, while working at the National Institute in Hampstead, and since his return to Australia, he has published much on this subject. In his investigations at the Walter and Eliza Hall Institute in Melbourne, Burnet has been associated with E. V. Keogh and Dora Lush and their collaboration has now extended to the preparation of a monograph on the immunity reactions,[1] now reprinted from the *Australian Journal of Experimental Biology and Medical Science*.

The first two chapters are introductory. Quite rightly the authors deem it necessary, before proceeding to their main subject, to say a few words about the probable nature of viruses and about modern views on antigen-antibody reactions. Most virus workers will agree with them that viruses can be most usefully considered as independent living micro-organisms but not everyone will accept the view that the group at the National Institute of Medical Research have led the way in formulating this conception. Observations of the greatest value have come from this institute and the investigations of W. J. Elford and J. E. Barnard evoke unstinted admiration. But the fact that viruses can be measured and seen and photographed in their natural state is only part, and not even the most important part, of the evidence in support of their being alive.

The chapter on the modern conception of antigen-antibody reactions is, as the authors admit, largely based on J. R. Marrack's valuable monograph. Following this come a number of chapters in which the interaction of representative viruses and their antisera are considered in detail. That on the bacteriophage—the longest of all—is concerned almost exclusively with the experimental work of Burnet with a large coli-dysentery phage Cl6. The percentage law of Andrewes is confirmed and discussed and the evidence in support of the existence of receptors on the phage particle for antibody on the one hand, and the bacterial cell on the other (the A and B receptors) is considered. The union of phage and antibody is shown to be fundamentally similar to other antigen-antibody reactions, apparent differences being due to the small size of the phage particle and the relatively small number concerned in these

[1] The Immunological Reactions of Filterable Viruses. By F. M. Burnet, E. V. Keogh, and Dora Lush. University of Adelaide, 1937. Pp. 141. 10*s*. Obtainable from the librarian of the University, or from H. K. Lewis and Co., London.

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reactions. The next chapter deals with the immunology of plant viruses—or more correctly the virus of tobacco mosaic, since this one has alone been adequately studied. Here, at first sight, the reactions exhibited differ from what has been found in the case of the bacteriophages or the animal viruses. Nothing approaching the percentage law pertains and dilute serum gives no neutralisation of virus unless the latter is adequately diluted. But, as Burnet and his colleagues point out, these differences are due to the enormously greater concentration of antigen in the mosaic virus-antibody system—antigen and antibody are in almost equal proportions—whereas with phage and animal viruses the virus particles are surrounded by an overwhelming excess of antibody.

Before proceeding to a detailed discussion of the immunity reactions of a selection of animal viruses, the authors devote a chapter to some general considerations respecting these reactions. The reason why these reactions should be reversible and the possibility of their proceeding to a less reversible or even firm union is discussed and they conclude, as M. H. Merrill has already done, that the reactions will stop short of visible aggregation even should the union become a firm one, so long as the antigen concentration falls below a certain critical level. Complement fixation comes somewhere between neutralisation and visible aggregation but still requires a high concentration of antigen. With these points in mind, the reactions of certain animal viruses and their antisera, as studied by the egg technique, are analysed. According to Burnet the use of the chorio-allantoic membrane of the developing egg offers a means of virus titration of great accuracy than any hitherto employed. The conclusion reached is that, here also, the reactions do not differ fundamentally from other antigen-antibody reactions. The view is held that neutralisation of a virus is due to union between virus and antibody, the coating of the virus particle with antibody globulin rendering it more difficult for the virus to enter a susceptible cell and to multiply once it has reached this situation.

The concluding chapters of this admirable monograph deal with such questions as the site of antibody formation, virus immunity considered from a biological point of view, and active immunisation against virus infection.

VASODILATATION IN AN ISCHÆMIC LIMB

IT has been long known that occlusion of the blood-supply to a limb dilates the small vessels of that limb. An increased acidity of the blood, accumulation of a histamine-like substance, and accumulation of adenylic acid compounds have successively been blamed for this action. F. T. Billings and B. G. Maegraith conclude that all three are to blame, though their effect is to induce an efficient collateral circulation (*Quart. J. exp. Physiol.* January, 1938, p. 249). Ischæmia was produced in rabbits by tying the common iliac artery of one leg above the origin of the hypogastric artery. The level of histamine in blood from the ischæmic limb was found to rise; it reached a maximum in about six hours and returned almost to normal in about twelve hours. Blood from the normal leg, meanwhile, showed only a very slight histamine increase. The muscle histamine of the ischæmic leg also rose and was still high when the blood had become normal. Blood "A-substance" (allied to adenosine), normally present in the red cells only, was raised in the ischæmic limb, and remained high for over twelve hours. In muscle the A-substance was considerably raised for about the same time. The normal limb showed no increase and injection of large amounts of adenosine led to no rise in the blood. Both tissues and red cells contain a substance that inactivates adenosine and A-substance quite rapidly. The blood *p*H became slightly more acid in the ischæmic limb, but the change in the tissue *p*H was much greater. The rate of blood-flow in the common iliac vein after tying the artery showed an initial slight rise, followed in a few minutes by a slowing which continued for some hours. Nine to twelve hours later the flow increased considerably, though still below normal. Gangrene never occurred, and on injecting the arteries three months after the occlusion a remarkably fine collateral circulation was found.

ARTIFICIAL LIMBS THAT ALLOW FOR GROWTH

DETAILS of artificial limbs made for a Chinese girl aged 8 have been sent us by Messrs. W. R. Grossmith (12, Burleigh-street, London, W.C.). Her legs were burned by bandits and had to be amputated above the knee at the C.M.S. Hospital at Hinghwa. The difficulty of altering them in China as the child grew made it necessary that the legs should be adjustable. The sockets for the stump are of firm leather with an overlap fastened by straps, so that they can be expanded (Fig. 1). In the thigh the socket is sleeved on to the knee and can be extended as required and riveted to a lateral steel (Fig. 2). Similarly the calf is sleeved on to the ankle, with a telescopic steel which can be fixed with screws. The sleeves have leather coverings so that there is no gap when they are extended. The total lengthening possible is 4 in. One limb has an adjustable ring catch knee-joint which can be made rigid for walking or freely movable. The legs weigh 6½ lb. and the child is delighted with them.

FIG. 1

FIG. 2

BAYER 205 IN THE BLOOD STREAM

IN the *Biochemical Journal* for January W. G. Dangerfield, W. E. Gaunt, and A. Wormall describe a method, based on that of Lang, for the colorimetric estimation of Bayer 205 (Germanin) in aqueous solution or in plasma. This method, they say, is accurate for even the smallest amount of the drug that has been shown to exert a definitely trypanocidal effect. They found that the plasma of rabbits which had received relatively large single doses (0·1 g. per kg.) contained a significant amount of drug (at least 1 mg. per kg.) even 5–6 months after the injections. Administered in divided doses over a few weeks, the same total produced even slightly higher ultimate values. The investigators agree with the general opinion that the high prophylactic value of Bayer 205 is largely attributable to its long retention by the body.

Dr. Frederick Price has been elected a correspondent member of the Société Française de Cardiologie.

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ADDRESSES AND ORIGINAL ARTICLES

THE TREATMENT OF RETENTION OF THE TESTIS *

BY T. W. MIMPRISS, M.S. Lond., F.R.C.S. Eng.
CHIEF ASSISTANT, SURGICAL UNIT, ST. THOMAS'S HOSPITAL, LONDON

ALTHOUGH A. D. Bevan was by no means the first to operate on children suffering from retention of the testis, the views expressed in his paper in 1899 represented a great advance, and he laid the foundation for the surgical treatment which has now been employed for many years. Treatment underwent no further radical change until the introduction by Schapiro (1930) of hormone therapy, and enough time has now elapsed for some conclusions to be drawn as to the place of surgery and hormone therapy in this condition.

The term retention is here used to include all cases in which the testis is absent from the scrotum at birth; cases in which the testis is occasionally absent from the scrotum are referred to as instances of retraction.

This paper is based on a study of the treatment adopted at St. Thomas's Hospital over a period of 11 years (1927 to 1937).

SURGICAL TREATMENT

A follow-up of the patients admitted in the eight-year period, 1927–34, shows the results of surgery (Table I).

TABLE I—SURGICAL TREATMENT AT ST. THOMAS'S HOSPITAL (1927–34)

Patients admitted		172
Condition		
Retention of right testis		75 patients.
" left testis		53 "
" both testes		44 "
Number of retained testes		216
Treatment		
Orchidopexy		138
Abdominal reposition		7
Orchidectomy		36
No treatment		35

Coexistent hernial sacs were noted in 85 per cent. of these operations.

TABLE II—RESULTS OF THREE TYPES OF OPERATION

A.—70 operations	
Testis well down in scrotum and of good size	28
High scrotal—small size	29
Pubic or inguinal position—small	13
Proportion of satisfactory results	40 per cent.
B.—9 operations	
Good position and size	4
High scrotal position and small	3
Inguinal position—small	2
Proportion of satisfactory results	44 per cent.
C.—13 operations	
Good position and development	11
Good position—small size	1
High scrotal—small size	1
Proportion of satisfactory results	85 per cent.

Patients on whom an orchidopexy had been performed were asked to report and 80 patients representing 92 orchidopexies attended. In this group three types of operations had been performed.

(*a*) Modification of the operation described by Bevan. The testis is freed and the cord elongated by excision of the processus vaginalis and fibrous and connective tissue components of the cord. The testis is then held down in the scrotum for ten days by the traction of a stitch passed through the scrotum and fastened to the thigh—a procedure of which Bevan expressly disapproved.

(*b*) A similar operation in which no traction stitch was employed.

(*c*) The operation of septal transposition described by Turner.

The *results* of these operations have been judged by the position and size of the testis, and are set out in Table II.

The similarity in the results of Types A and B suggests that the tension suture does not act for a sufficient period to have a lasting effect.

Age.—In this series factors such as (1) ectopia, as opposed to imperfect descent; (2) bilateral, as opposed to unilateral retention; (3) the position of the testis before operation; and (4) the age of the patient at operation did not seriously affect the outcome of one type of operation as opposed to another. Age is the only factor which favoured the septal transposition group, but it does not account for the great disparity (see Table III).

TABLE III—EFFECT OF AGE AT OPERATION ON RESULT

Age.	Number of operations.	Number of good results.	Per cent. satisfactory.
Whole Series			
Under 10 ..	29	10	34
10–14	45	27	60
Over 14 ..	18	6	33
All ages ..	92	43	46·7
Bevan Operations			
Under 10 ..	28	9	32
10–14	37	19	51
Over 14 ..	14	4	29
All ages ..	79	32	41·1
Turner Operations			
Under 10 ..	1	1	100
10–14	8	8	100
Over 14 ..	4	2	50
All ages ..	13	11	85

Table III shows that in the whole series the best results were obtained at the 10–14 age-period; and that in the Bevan cases the results were least unsatisfactory at this period. This is the time at which puberty changes occur, including growth of the testis, elongation of the cord, and development of the scrotum—all mechanical factors which assist in the satisfactory outcome of any orchidopexy.

Spontaneous descent.—There is one other point in this follow-up which is important. In three boys, who were classified as cases of bilateral retention and on whom a unilateral orchidopexy was performed, spontaneous descent of the other testis had occurred by the time I saw them. In each case the operation had been performed in the early age-period and in each case the operative result was a failure. Having noted this undoubted incidence of spontaneous descent, I requested the small group of children

* A Hunterian lecture delivered before the Royal College of Surgeons of England on Jan. 31st.

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discharged without treatment to attend. Twelve responded (8 bilateral and 4 unilateral cases). The position of the bilateral cases is now as follows:—

Spontaneous descent on both sides has occurred in		2	children.
„ „ one side „ „		2	„
Testes still retained in		4	„

Of the unilateral cases spontaneous descent occurred in 1 child.

Three conclusions can justifiably be drawn from this section of the paper: (1) The anatomical results of orchidopexy are better if operation is deferred until the 10–14 age-period—i.e., the period of puberty. (2) An orchidopexy of the Bevan type is unsatisfactory as a routine procedure. (3) Spontaneous descent of the retained testis can occur in older children.

HISTOLOGY OF RETAINED TESTES

Before accepting 10–14 as the correct period for orchidopexy, it is necessary to consider the histology of the retained testis.

It is well known that retained testes examined after puberty have undergone some degree of degeneration, characterised by intertubular fibrosis, thickening of the basement membrane, decrease in the number of tubules, absence of spermatogenesis, and replacement of the tubular cells by cells of Sertoli. The histology of the retained testis in younger children is on a less sure footing; Wangensteen (1927) wrote: "Numerous authors state that the anatomy of the imperfectly descended testis is normal up to puberty, but unfortunately very few are available for microscopy." He agreed however that the undescended pre-puberty testis is histologically similar to the scrotal testis of the same age.

Cooper (1929) found that the pre-adolescent undescended testis is healthy but undeveloped, and pointed out also that even some scrotal testes in the early years showed arrest of development. This is characterised by the isolation of the tubules, the increase of interstitial tissue which appears in the form of a nucleated embryonic stroma, and a diminution in size of the tubules.

The evidence is then that the infantile retained testis has a relatively normal histological appearance but that with adolescence degenerative changes appear. There is certainly no reason to doubt that a retained testis which is showing only the signs of delayed development can develop normally if placed in the scrotum.

Apparently degenerative changes do not necessarily indicate inability to develop. The experimental work of Wangensteen suggests that a retained testis whose tubules still contain spermatogonia is capable of development and activity if placed under suitable conditions in the scrotum. Obviously it is better to transplant the testis before degenerative signs have supervened on those of retarded development; but in the opinion of authorities such as Cabot (1935) orchidopexy should be considered for many adults suffering from this condition.

I have examined sections of twenty specimens of retained testes obtained by orchidectomy in this series to ascertain (1) if degenerative changes were present at the 10–14 age-period, (2) if testes retained after this age were still capable of development.

In the *first group* there are six specimens removed at the ages of 10, 10, 11, 13, 13, 14. The sections of all these testes show small tubules isolated by a nucleated embryonic stroma; the tubular cells consist chiefly of spermatogonia and undifferentiated cells. One can say therefore that these all represent the picture of delayed development and have undergone no degenerative change as a result of their failure to reach the scrotum before this 10–14 age-period. Arrest of development is a conspicuous feature of these testes; but the records show that at operation they were found to be small and retained high up on the line of descent. Hence it is fair to assume that these sections present as unfavourable a histological picture as any retained testis at that age is likely to show.

In the *second group* there are fourteen specimens removed at the following ages: 16, 17, 17, 21, 21, 22, 24, 26, 27, 28, 33, 35, 47, 48. These all show degenerative changes in varying degrees. Only five show spermatogonia in the tubules. They were excised at the ages of 16, 17, 17, 21, 48. Actually the atrophic changes in the two last are so marked that one cannot take an optimistic view of their potential activity; but the three younger ones appear to be capable of development.

Wangensteen (1927) examined 17 adult retained testes and found spermatogonia present in the tubules of 2, while Pace and Cabot (1936), on the same principle, considered 13 out of 24 which they examined might have developed if a satisfactory orchidopexy had been accomplished.

Here again it is likely that these testes excised at operation represent the smaller and more atrophic specimens of retained testes at this age-period, and it is probably justifiable to perform an orchidopexy on a man below 30, provided that the operation is not unduly difficult from a mechanical aspect.

This histological portion of this follow-up therefore shows that delayed development is still the characteristic of the retained testis at the 10–14 age-period and that orchidopexy can safely be deferred until this age. After the age of 16 degenerative changes are constant, and though orchidopexy is justifiable in young adults the chance of obtaining an active testis after the age of 20 is probably small.

HORMONE THERAPY

The next investigation into this subject took the form of a trial of gonadotropic hormone therapy on a series of fourteen new patients who were unselected except for the fact that they were between the ages of 5 and 15 and included no cases of obvious ectopic descent or of retraction of the testis.

The preparation used was Pregnyl (Organon Laboratories). This was administered intramuscularly in doses of 500 rat units, either once or twice a week. The number of injections varied between 8 and 40. The effect on all patients was to stimulate the growth of the external genitalia—i.e., the penis, scrotum, and testes. Descent of the testis was obtained in four children, and seemed to be entirely dependent on this increase of development of the genitalia. As development increased so did the testis descend further and further along the natural line of descent. The common characteristic of these successful cases, prior to treatment, was that their genital development was small and showed no evidence of a puberty change, and further, that the testes were mobile and could be pushed down in the direction of the scrotum. The remaining ten children failed to obtain descent; but their response to the treatment is interesting.

One boy of the Fröhlich type, who presented gross hypogenitalism, showed little developmental change, and neither testis could be palpated at the end of treatment.

The other nine children, only one of whom showed subnormal genital development, all reacted to treatment in that development of the external genitalia was stimulated, but in contrast to the four successful cases this increase in development was not accompanied by a gradual descent of the testis. An orchidopexy was subsequently performed in each case and at operation the testis was found to be mechanically retained.

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Mechanical retention is a term used to imply the presence of an anatomical factor other than shortness of the cord which prevents a testis from reaching the scrotum. It includes cases in which the testis is retained above a ring; is adherent to some other structure; is ectopic; or is prevented from reaching the scrotum by the absence of a path into the scrotum.

The results in these fourteen children suggested strongly that development of the genitalia had a very important bearing on retention of the testis.

Continued retention in the presence of increasing development of the reproductive system seemed to denote a mechanical cause of retention which could only be overcome by operation. On the other hand some testes which were associated with small development appeared to descend as development of the reproductive system ensued.

It therefore seemed that hormone therapy could be usefully employed only in those children in whom retention was associated with small genital development.

SPONTANEOUS DESCENT

Further experience of children suffering from this condition led me to wonder whether my four successful patients would not have achieved descent unaided as their reproductive systems developed. There was no reason to suppose that natural development had reached its limit by the time therapy was started, so it seemed likely that the testis might have descended spontaneously—a possibility not universally accepted.

Several instances of spontaneous descent in older children were noted during my follow-up of the 1927–34 period. So it seemed reasonable to ascertain if descent could be achieved by allowing development to proceed naturally instead of by hormonic stimulation.

A comparable group of patients (thirty-one in number) were therefore treated on different lines. No treatment was considered until they had reached puberty, between the ages of 10 to 16, but they were kept under observation.

Where increased development was associated with a retained testis which could not be manipulated into the top of the scrotum, orchidopexy was performed, and in the nine boys so treated mechanical retention was found in each case.

No less than nine patients obtained spontaneous descent during this period of observation at the ages of 3, 5, 8, 9, 10, 11, 12, 13, 16. These children were similar to those in whom success was obtained by the use of hormone therapy—that is to say, they were suffering from no gross endocrine disturbance, but their retention was associated with subnormal development of the genitalia. When first seen the penis and scrotum were small and the testes were small and could be manipulated down along the normal line of descent.

Descent has kept pace with the gradual onset of growth of the whole reproductive system. The age at which it has been complete has depended upon the degree of development of the reproductive system, which even in normal children is not constant.

I want now to compare the results of this period of observation with my previous results from hormone therapy.

In the hormone series fourteen new cases were submitted to treatment; four successes were obtained. A rather rapid genital development was produced and descent occurred in a period of a few months. In the period of observation (2½ years) thirty-one new cases were followed; descent has occurred in nine and there are probably more potential successes.

The type of case which reacted favourably to pregnyl is the type in which spontaneous descent has occurred.

Development of the reproductive system occurred in both groups, although at rather different rates. With that development the testis either descended or, if it failed to do so, an operation was necessary to deal with the underlying mechanical factor.

ACTION OF HORMONES

Before proceeding with the routine use of hormone therapy, it seemed necessary to consider its action and effect more carefully.

Experimental results are variable, but the evidence is that while gonadotropic hormones have little effect on the mature male they greatly increase the growth of the reproductive system of the immature male.

Experimentally hormones can produce a precocious puberty in animals, and there are many clinical reports suggesting that they will produce a precocious puberty development of the reproductive system if given in sufficient doses.

Dorff (1935) quotes the following effects in hypogenitalism: hypoplastic testes increase in size; the scrotum fills out and progresses towards normal development; the penis enlarges in size and thickness and pubic hair develops; the epididymis and prostate are stimulated and the general mental aspect of the patient changes. In some cases he noted congestion of the external genitalia and frequent erections.

On this basis the mechanism of a hormone success is apparent. Any undescended testis that would descend as development increases can be brought down by hormone therapy if the dosage is adequate to stimulate sufficient growth of the reproductive system. My experience of treating one series by hormones and another by observation bears evidence to the fact that the testis which is not mechanically retained is only awaiting an adequate degree of development before the scrotal position is gained.

INDICATIONS FOR HORMONE THERAPY

In spite of the successes reported by other workers, sometimes with even one or two injections, the evidence is that hormone therapy can only induce descent of a retained testis by means of its stimulating effect on the development of the reproductive system; and further that development will often take place naturally if the opportunity is given. On this basis one can discuss the question of administering hormone therapy in all cases or of reserving its use for cases in which natural development seems unlikely—an event which certainly cannot be excluded until the age of 12.

There are two possible objections to the routine use of hormone therapy. Stimulation of the reproductive system may be (1) undesirable, (2) harmful. Precocious sexual maturity has been recorded on many occasions and has led clinicians to withhold hormone therapy in young children. Prostatic enlargement has been recorded by Dorff (1935), Sexton (1934), and Aberle and Jenkins (1934). I have noted this in one child and although it produced no symptoms it is, I think, undesirable.

The question of late damage to the testis has been raised by Cabot (1936) and is not yet settled. Experimental evidence obtained from the immature animal is inconclusive, although Cole (1936) has noted signs of damage in the tubules of rats treated with heavy dosage. Clinical evidence of damage is not forthcoming, for these preparations have only been used for a few years; but a retained testis in one of my patients which enlarged considerably during treatment had retrogressed in size and was found to be

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small at operation some months later. It is reasonable to suppose that a retained testis which receives an artificial puberty stimulus, but fails to descend, should undergo those degenerative changes which are well known to ensue in untreated cases which fail to descend after puberty.

EFFECTS IN RATS

If hormone therapy can damage the testis, it is the undescended organ which will suffer most. In support of this statement I have tried the effect of hormones on both the descended and the retained testes of rats.

(I) *Effect on the reproductive system of the immature rat.*—Young rats received four doses of 50 rat units of pregnyl at 3-day intervals, starting at the 17th day. They and a litter control were killed at weekly intervals starting at the 27th day, so that the immediate and late effects of this treatment could be ascertained on (*a*) the growth of the reproductive system, and (*b*) the histology of the testis. Table IV shows the

TABLE IV—EFFECT OF GONADOTROPIC HORMONE ON DEVELOPMENT IN RATS

Age in days.	Weight of testes in grammes.		Weight of prostate and vesicles in grammes.	
	Control.	Injected.	Control.	Injected.
27	0·30	0·40	0·04	0·13
34	0·70	0·58	0·11	0·34
41	1·12	0·94	0·14	0·43
48	1·52	1·17	0·20	0·66
55	1·82	1·40	0·23	0·64
62	2·21	1·88	0·35	0·89

remarkable stimulus to growth in the early stages, as recorded by many observers. In the later weeks on the other hand the testes in each case weighed less than the controls, although the prostate and vesicles maintained their lead.

The histology of these testes is more difficult. In the early sections there is a hyperæmia and œdema of the testis and an albuminous secretion in the tubules which probably accounts for an increase in weight at this stage. There is no evidence of the hyperplasia of the interstitial cells which is recorded by others, the majority of whom have used smaller and more frequent doses of hormone. In the later stages when the injected testis weighed less than the control there is little apparent histological difference except in the two last, where there is the appearance of tubular damage, in that the tubular cells are less active and less numerous.

In the immature rat, then, four large doses of pregnyl produced gross hypertrophy of the accessory organs of reproduction, with hypertrophy of the testis in the early stages, followed by a relative loss of weight later, this loss of weight being suggestive of damage to the testis.

(II) *Effect on the reproductive system of the immature male rat, in which artificial retention of the testes has been produced.*—These experiments were on exactly similar lines to the previous ones; except that both the injected rat and its control were operated on to produce bilateral retention of the testis at the 14th day. Four doses of 50 rat units of pregnyl were given at 3-day intervals, starting at the 17th day.

In the control rats the weight of the testis and accessory organs was almost constant (Table V). In the injected rats the accessory organs showed a relative increase, while the testes showed a relative decrease in weight.

In these experiments the histological changes are definite. The testes of the control rats showed changes which progressed gradually according to age. The tubules enlarge, but the tubular cells fail to proliferate to a corresponding degree so that the lumen of the tubules appears wide. This appearance is most marked in the testes of the rat killed at

TABLE V—EFFECT OF PREGNYL IN RATS WITH ARTIFICIAL RETENTION OF TESTES

Age in days.	Weight of testes in grammes.		Weight of prostate and vesicles in grammes.	
	Control.	Injected.	Control.	Injected.
32	0·53	0·46	0·11	0·16
39	0·52	0·41	0·10	0·17
46	0·45	0·32	0·09	0·19
53	0·50	0·32	0·09	0·26

the 53rd day; but even here the tubules are still closely packed together and there is no evidence of a gross degenerative process.

The testes of the injected rats show that the enlargement of the tubules and the associated failure of proliferation of the tubular cells occurred at an earlier age. The testes of rats killed at the 46th and 53rd day both showed well-marked degenerative changes which are not seen in the controlled testes—i.e., the tubules are relatively few in number, the tubular cells are very scanty, and there is evidence of early intertubular fibrosis. If the weight of the testis and the histological findings are taken into account, it is apparent that the effect of hormone injections has been to stimulate the onset both of development and of subsequent degeneration in these mechanically retained testes.

These experiments suggest that there are definite risks in stimulating the development of a child's testis which cannot descend into the scrotum, as the onset of degenerative changes may be hastened.

The following conclusions can be drawn from this section dealing with hormone therapy and spontaneous descent.

1. Spontaneous descent of the retained testis does occur between birth and puberty and is dependent on the increased development of the reproductive system.

2. Persistent retention in the presence of increasing development signifies that the testis is retained through a mechanical abnormality which can only be overcome by operation.

3. Hormone therapy aims at stimulating the development of the reproductive system and therefore hastens descent. Its routine use is unnecessary as natural development will usually occur and is undesirable as it (1) produces precocious puberty, and (2) may cause atrophy of testes that are mechanically retained. It should be withheld until the age of twelve and used then for children in whom natural development is not taking place.

MANAGEMENT OF RETENTION

There are two principal theories as to the cause of retention. One was expressed by John Hunter in 1786: "It is not easy to ascertain the cause of the failure in the descent of the testis; but I am inclined to suspect that the fault originates in the testicles themselves." The other was summed up by Wangensteen (1927): "The undescended testicle owes its imperfection to its position."

The first theory implies that the development of the testis and of the whole reproductive system is at fault; that if the developmental factor were rectified the testis would descend. The second implies that the testis develops normally, as far as it

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may in its abnormal position, but is prevented from coming down by a mechanical factor which may be bands; adhesions; an ectopic position; or the absence of a path into the scrotum. I have recorded sufficient instances of spontaneous descent, hormone successes, and operations for the relief of mechanical retention to show that there is truth in each.

Management therefore aims at correcting a developmental fault or a mechanical fault or a combination of the two. If both faults are present development must if possible be rectified first, as an undeveloped testis with a short cord cannot satisfactorily be transplanted into a rudimentary scrotum. Retarded development may be corrected by natural growth or by hormonic stimulation. Mechanical retention can only be overcome by operation.

Treatment incorrectly applied can be both unnecessary and harmful. Operations where development is at fault and hormone therapy where there is a purely mechanical obstruction are examples of this. For this reason it is essential to assess the factors responsible for retention before commencing active treatment.

At birth I believe it is impossible to say why a testis is not in the scrotum; or whether the fault is developmental or mechanical or a combination of the two; further, whether a developmental failure will be rectified naturally. This does not matter since in the absence of complications the cause of retention is immaterial until the period of puberty is reached. Until this time the testis does not suffer by remaining in its undescended position and the optimum age for treatment has not been reached.

I believe, moreover, that development should not be stimulated by hormones until the age that puberty changes should occur; and that operation also should not be employed until this period, so that in the absence of complications, the problem of the retained testis does not arise until the age of 10.

Between birth and the age of 10 many children whose testes were retained owing to developmental retardation will have obtained development sufficient for spontaneous descent to occur. At or after the age of 10 the factors responsible for continued retention can be assessed and treatment administered where necessary. Treatment is still unnecessary if spontaneous descent is likely. Treatment is necessary by hormone therapy if natural development seems unlikely and by operation if the testis is mechanically retained.

TABLE VI—CLASSIFICATION AND TREATMENT

A. *Mechanical Retention* (Bilateral/Unilateral)

Type: Normal child.
Normal genital development.
Testis in an ectopic position or incapable of manipulation towards the top of the scrotum.
Treatment: Orchidopexy.

B. *Retention due to Delayed Development* (Bilateral/Unilateral)

Type: Normal child.
Subnormal genital development.
Testis small and mobile in the direction of the scrotum.
Treatment: Usually unnecessary as spontaneous descent is likely.
If the scrotum is enlarging and the testis can be manipulated to the top of the scrotum, descent is imminent.
Hormone therapy can reasonably be employed after the age of 12.

C. *Retention associated with an Endocrine Disturbance* (Bilateral/Unilateral)

Type: Abnormal child (e.g., Fröhlich's type).
Marked hypogenitalism.
Testis may or may not be be mechanically retained. In the presence of hypogenitalism it is often impossible to state whether a mechanical factor is present.
Treatment: Hormone therapy at or after the age of 12.
Orchidopexy may be necessary later.

Children can be classified into three main groups at this period by noting (1) the general appearance of the child, (2) the development of the genitalia, and (3) the situation and mobility of the testis (Table VI).

No simple classification can cover every case, and no line of treatment can be universally successful, but management on these lines should allow spontaneous descent to occur where possible; hormone therapy to be used where development is grossly at fault; and operations to be employed on testes whose failure to descend is due to causes other than lack of development.

A classification of the thirty-one children collected since 1935 shows that ten of them (four bilateral and six unilateral) are still below the age of 10. Descent has occurred on one side in two and on both sides in another bilateral case. Of the unilateral cases descent has occurred in one child and one child with mechanical retention developed a hernia at the age of 8 and was submitted to orchidopexy.

TABLE VII

Bilateral Cases

(I) Mechanical—3 boys: orchidopexy has been performed at about the age of 12.

(II) Delayed—6 boys: descent has occurred on both sides in 3 and on one side in 1 boy and is likely to follow in the other 2 in whom development is still small.

(III) Endocrine—1 boy: receiving treatment with pregnyl.

Unilateral Cases

(I) Mechanical—7 boys: in 5 orchidopexy has been performed; in 2 development is still small and it is better to wait longer.

(II) Delayed—3 boys: in 1 descent has now occurred and in the others is likely.

(III) Endocrine—1 boy: will soon receive hormone therapy.

Over the age of 10 there are now ten bilateral and eleven unilateral cases classified under the headings of: (I) mechanical, (II) delayed, and (III) endocrine.

Starting therefore with thirty-one children suffering from retention of the testis at birth this method of management has enabled nine to solve the problem for themselves, and nine to have an orchidopexy on a mechanically retained testis at an age when development was sufficient for a good anatomical result to be obtained.

Thirteen are left. In four there is every reason to expect that descent will occur. In two increase of development suggests more and more definitely that orchidopexy will be necessary to deal with the mechanical cause of retention. Five at present I would hesitate to put into any group; but, as they are young, that is immaterial. Two suffer from an obvious endocrine disturbance; one is having hormone therapy and the other will need it.

Two years ago I should have given this group of thirty-one children a course of pregnyl and should have had nine successes and nine failures; but I can now state that both successes and failures would have been inevitable. Therefore no routine course of therapy will be employed in those boys in whom retention is still present.

There is a place for hormone therapy; but in my opinion not a very large one. As yet it has been used on two children in this group of thirty-one.

One was a boy of 16 with bilateral retention in whom development was very late in appearing, but in whom spontaneous descent had progressed to the stage when both testes would lie in the upper part of the scrotum. As he was entering a Service it seemed reasonable to hasten the process, and this was achieved by hormone therapy. I classify him as an instance of spontaneous descent.

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The other is a boy of the Fröhlich's type with bilateral cryptorchidism and gross hypogenitalism. Under prolonged and energetic hormone therapy his penis and scrotum have developed somewhat, but his testes have remained retained and impalpable.

I have only recently realised that these two patients summarise my experiences with this product; that is to say, one can get a good result in the patient in whom descent will occur anyway and a result of doubtful nature in the children who really do present a problem for treatment.

KEETLEY-TOREK TECHNIQUE

Whatever views one has as to the use and misuse of gonadotropic hormone therapy, the fact remains that orchidopexy has to be performed on testes retained by a mechanical cause.

The general consensus of opinion points to the Keetley-Torek technique as the most satisfactory. This method enables the testis to be held in good position indefinitely while the scrotum enlarges. This is one reason why the results are good; another is that the technique can only be employed if the testes will reach well down into the scrotum. The septal transposition operation also has these advantages but fails to produce so good an anatomical result.

The thirty-three orchidopexies by the Keetley-Torek technique performed at St. Thomas's Hospital surgical unit can be divided into the following groups:—

Group 1.—Seven in patients who had had previous unsuccessful Bevan operations, without sustaining damage to the testis.

Group 2.—Twenty-six in new cases in the following age-periods: 7–9 (3 operations); 10–15 (17 operations); 16–30 (6 operations).

The *results* have been judged by the same standards as in the original follow-up of orchidopexies; they are:—

Group 1.—All seven satisfactory.

Group 2.—(*a*) 2 good, 1 unsatisfactory; (*b*) 16 good, 1 unsatisfactory; (*c*) 5 good, 1 unsatisfactory. Total—90 per cent. satisfactory.

The failure in the 7–9 age-period was due to an error of judgment in operating on a boy who had an obvious ectopic testis, but in whom development of the genitalia was not very advanced. A small ectopic testis was freed, but the cord was too short to enable it to reach the scrotum. Had operation been deferred for two or three years, it is unlikely that this difficulty would have been encountered.

The failure in the 10–15 age-period was I think excusable. The boy was aged 12 and had been treated with pregnyl; his development was considerable; but at operation the testis was found in the abdominal cavity and again the cord was short.

I am hopeful that both these failures can be corrected at a second operation, as great care was taken in preserving the blood-supply and the testes were left at the external ring, as suggested by Cabot.

The failure in the adult group was one of technique, in that the anastomosis between the scrotum and the thigh parted at the 10th day.

The results of this small series of orchidopexies compare very favourably with those of the 1927–34 operation period. In part it is certainly due to changing the standard operative procedure from Bevan to Keetley-Torek. The other factor which has been very important in this series is that the necessity of avoiding operation in young, poorly developed children has been recognised.

In the later operations of this series there has been a slight deviation from the Keetley-Torek technique.

A much smaller anastomosis is made between the lowest part of the scrotum and the skin well down on the thigh. The processus vaginalis is divided just below the internal ring and the distal portion is not dissected from the cord. The tunica vaginalis is then sewn down to the fascia of the thigh, so as to hold the testis well down in the scrotum. No stitch is inserted into the testis which is left in the scrotum, but anchored by its tunica vaginalis.

This modification was employed as in the course of experimental work it was noted that the passage of a stitch through the tunica albuginea of the testis had an adverse effect on its histological appearance. In practice it has also been an improvement in that at the second stage the testis is left entirely free in the scrotum and shows no tendency to become adherent to the scar of the scrotal incision. It is true that by leaving the processus vaginalis, distal to the internal ring, in situ, the surgeon cannot gain extra length by a thorough dissection of the cord. This, in my opinion, is an advantage; as what the surgeon gains in length the testis loses in blood-supply. If operations are performed on properly selected cases there is seldom difficulty in placing the testis into the scrotum; should difficulty be found, it is better to adopt Cabot's suggestion of leaving the testis at the external ring and operating later to obtain the scrotal position.

By the adoption of the principles which I have outlined I believe that spontaneous descent will be a common event; that hormone therapy will be employed in suitable cases; and that operative treatment, though less often necessary, will show a high proportion of satisfactory results.

CONCLUSIONS

1. The causes of retention of the testis are developmental or mechanical, or both.
2. Management of retention of the testis depends on a correct assessment of the cause. This can best be made when the patient is approaching the age of 10.
3. Testes not mechanically retained will descend when development is adequate.
4. Development may increase either naturally or with the aid of hormone therapy.
5. Hormone therapy should be reserved for those in whom natural puberty development seems unlikely.
6. A mechanical cause of retention can only be overcome by operation; and satisfactorily overcome only if development is adequate.
7. Orchidopexy is best performed by the Keetley-Torek technique.
8. Both orchidopexy and hormone therapy, applied without proper indications, can do more harm than good.

I am greatly indebted to the surgeons of St. Thomas's Hospital for their kindness in referring patients to me, and especially to Mr. C. Max Page, under whose direction this work has been carried out on the surgical unit. I have had the greatest assistance in the histological and experimental side from Dr. D. C. L. Derry, pathologist to the unit, to whom I am most grateful.

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MEASUREMENT OF VITAMIN B_1 IN HUMAN URINE AS AN INDEX OF THE NUTRITIONAL LEVEL

FURTHER QUANTITATIVE DATA

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IN earlier work (Harris and Leong 1936) it was shown that the amount of vitamin B_1 in urine could be conveniently measured by the "bradycardia" method, and that the level of excretion, as well as the response after a test dose, depended on the past intake of the vitamin. In vitamin-B_1 deficiency (including beri-beri in human beings and experimental polyneuritis in laboratory animals) the amount excreted fell to an almost negligible figure. It was suggested that the urine test could be used to assess the state of nutrition of the human subject with regard to vitamin B_1, and provisional standards were set out. Brief mention was made of surveys which were in progress on different classes of subjects, and the object of the present paper is to collect and analyse the data which have accumulated to date. As this is in the nature of an interim report fuller case-histories and detailed diet sheets will be postponed for a later publication.*

EXPERIMENTAL DETAILS

The following groups of subjects have been examined: (*a*) "normal controls"; (*b*) "surgical controls" (mostly poorly fed individuals from a hospital in a poor industrial area); (*c*) miscellaneous medical cases (from the same institution); (*d*) patients with polyneuritis held to be of nutritional origin; (*e*) patients with polyneuritis considered to be not primarily of nutritional origin; (*f*) cases of conditioned deficiency disease other than polyneuritis; (*g*) patients recovering from beri-beri.

The *normal controls* were mostly laboratory assistants or research-workers at the Nutritional Laboratory, Cambridge, but a number of subjects in London (office workers and laboratory assistants) and Singapore (research workers and laboratory assistants) were also included and found to give figures within the same limits. All were on their ordinary home diets during the period of the investigation.

The *surgical controls* were all taken from the surgical wards of a voluntary hospital in a large city in the north-east of England, and the *miscellaneous medical cases* and cases of *conditioned deficiency disease other than polyneuritis* as well as the cases of *polyneuritis* were from the medical wards of the same hospital (C.C.U. was responsible for the choice of cases in the last four groups and for providing the clinical histories; and P.C.L. carried out the urine analyses).

The cases of beri-beri were under treatment at the Tan-Tock-Seng Hospital, Singapore, the specimens of urine being placed at our disposal through the helpful collaboration of Prof. J. L. Rosedale.

In examining the urine of patients at a distance from Cambridge, the preliminary adsorption of the vitamin on acid clay, from the 24-hour specimen of urine, was carried out on the spot by the technique previously described. The activated acid clay was dried in a vacuum desiccator, and then dispatched by post to Cambridge where the tests on rats were performed (for details see Harris and Leong 1936).

Since our object in these experiments was not so much to obtain highly accurate values for given individual patients but rather to determine the *characteristic range of values* for the given groups, we have not always considered it necessary to examine more than one or two days' specimens from each case; and the assay has sometimes been limited to one or two rat-tests only on each such specimen. That this procedure has sufficed to give the information needed seems to be shown by the fact that, in the upshot, the various groups are each found to fall within fairly compact and distinctive limits.

TABLE I—NORMAL CONTROLS, CAMBRIDGE AND LONDON, MAY-OCTOBER, 1935

(Arranged in ascending order of resting levels)

Initials.	Occupation.	Urine tested (days).		Vitamin B_1 excreted (I.U.).	
		For resting level.	For test dose.	Resting level.	After test dose.*
A. W. D.	Lab. asst.	6	—	12	—
S. I.	"	11	1	13	36 (*b*)
T. W. B.	Res. worker.	4	1	14	44 (*h*)
S. A. C.	Lab. asst.	13	2	18	36 (*b*)
L. J. H.	Res. worker.	14	2	21	68 (*b*)
P. C. L. (1)	"	10	1	21	76 (*b*)
G. G. G.	Lab. asst.	11	2	22	47 (*b*)
P. C. L. (2)	Res. worker.	2	3	23	67 (*b*)
V. L.	Office worker.	4	—	27†	—
B. M.	"	4	—	35†	—

*In this and subsequent tables the following symbols are used to indicate the size of the test dose given: (*a*) = 300, (*b*) = 340, (*c*) = 350, (*d*) = 375, (*e*) = 400, (*f*) = 500, (*g*) = 525, (*h*) = 950 I.U. (international units).

†Diet contained proprietary wheat-germ preparation, rich in B_1.

RESULTS

The results for each of the separate groups are given in Tables I to IX. The final numerical conclusions are analysed in Table X and the results are summarised and arranged in order of magnitude in Table XI. A graphical presentation of the data (Fig. 1) shows clearly how the range of excretion varies from group to group.

CONCLUSIONS AND DISCUSSION

It will be observed (Fig. 1 and Table XI) that both in the "resting levels" and in the "responses to test doses" the same general order of descent is followed, as from one group to the next. Groups

*The present paper deals only with cases examined up to June, 1937. More recently a chemical process for estimating vitamin B_1 in urine has been under investigation by one of us (L. J. H.), and this alternative method may be expected to give results of higher precision—as well as effecting a considerable saving in labour. Since the present paper was prepared results in good agreement with the findings of Harris and Leong have been published in Holland by Westenbrink and Goudsmit (1937), who estimated the vitamin B_1 in urine chemically by means of the "thiochrome" reaction. (See also Helmer 1937, Karrer 1937, and Pyke 1937.)

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with the lower average "resting levels" give the lower "responses," and vice versa. This confirms the reality of the differences between the various groups.

The "normal controls" (middle-class subjects) come first in the scale, with the highest range of excretion; and the "surgical controls" (poor working-class subjects) fall into the second place with a significantly lower range. At a still lower level are the various groups of medical cases: of these the lowest average values were for the cases of (*a*) "beriberi under treatment," (*b*) "polyneuritis of nutritional origin," and (*c*) "other conditioned deficiencies." The separate groups may best be discussed in turn.

Normal controls.—These can be further subdivided into three sub-groups, examined at three different times (Tables I, II, and IX); two of these sub-groups consisted of subjects living at Cambridge or London, and one of normal individuals at Singapore. The range of values found has been approximately the same for each of these three sub-groups, the latest results obtained in 1937 confirming those previously reported for 1935. This agreement strengthens the belief in the reliability of the data for the "average" range of excretion.

Surgical controls.—The resting level of excretion of the so-called "surgical controls" was about one-third only of that of the normal subjects—viz., an average of 8 and a range of 4 to 12 as compared with an average of 22 and a range of 12 to 35 I.U. for the normals. We believe that this must be due very largely to the inferior diets on which most of these patients had previously been subsisting.

Still lower figures were found for the *miscellaneous medical cases* examined at the same institution (average 5, range 4 to 6 I.U.—i.e., about one-quarter of the values for the "normal" controls). In addition to the factor of poverty and unsatisfactory past diet, which operates to the same degree as in the surgical cases, the following additional causes may be instrumental in bringing about such lowered "reserves" in medical cases. (1) Anorexia accompanies many diseased states, and is responsible for a lowered total intake of food. (2) The hospital diets themselves sometimes contain meagre amounts of vitamin B_1, particularly, perhaps, those of the "bland

TABLE II—NORMAL CONTROLS, CAMBRIDGE AND LONDON, FEBRUARY-MARCH, 1937

(Arranged in ascending order of resting levels)

Initials.	Occupation.	Urine tested (days).	Vitamin B_1 excreted (I.U.) resting level.
S. A. C.	Lab. asst.	3	15
S. I.	"	2	17
A. W. D.	"	3	18
L. J. H.	Res. worker.	4	21
A. W.	Lab. asst.	3	21
M. A. A.	Res. worker.	2	23
P. C. L.	"	3	24
M. A. I.	"	3	25†
G. G. G.	Lab. asst.	3	33
B. O. Y.	"	2	35†

† Diet contained proprietary wheat-germ preparation, rich in B_1.

TABLE III—"SURGICAL CONTROLS," SEPTEMBER-DECEMBER, 1936

(Tables arranged in ascending order of resting levels)

Inits.	Occupation.	Diagnosis.	Diet.	Urine tested (days). For resting level.	Urine tested (days). For test dose.	Vitamin B_1 excreted (I.U.). Resting level.	Vitamin B_1 excreted (I.U.). After test dose.
Y. J.	Steel erector.	Fractured os calcis.	Hospital diet 12 days.	1	2	4·0	14 (*c*)
B. J.	Overman.	Torn cartilage.	Hospital diet 29 "	1	2	5·4	18 (*c*)
K. C.	Milk carrier.	" "	Home diet fair.	1	2	7·5	8·3 (*f*)
O. M.	Miner.	" "	Home diet "	1	2	7·8	20 (*f*)
M. A.	Labourer.	Fractured rib.	Home diet "	1	2	9·1	11 (*f*)
K. T.	Miner.	Fractured spine.	Home diet fairly good.	1	2	12	13 (*f*)

TABLE IV—"MISCELLANEOUS MEDICAL CASES," APRIL, 1936–JANUARY, 1937

M. J.	Musician.	Convalescent from pneumonia.	Hospital diet. 10 days.	1	—	3·6	—
E. M.	Housewife.	Carcinoma of stomach.	Hospital diet. 21 "	1	—	4·5	—
M. T.	Instructor.	General debility.	Hospital diet. 17 "	1	—	4·5	—
J. C.	Housewife.	Progressive muscular atrophy: syphilis.	Fair.	3	3	5·1	6·1 (*b*)
W. F.	Steelworker.	Fibrositis and sciatica.	Hospital diet 18 days.	1	—	5·9	—

TABLE V—CONDITIONED DEFICIENCY DISEASES OTHER THAN POLYNEURITIS, AUGUST, 1936–MARCH, 1937

W. M.	Housewife.	Atypical pernicious anæmia (and ? subacute combined degeneration).	Good.	1	2	1·2	2·7 (*f*)
S. A.	"	Pernicious anæmia and subacute combined degeneration.	Moderate.	1	1	2·4	4·0 (*a*)
M. J.	Miner.	Pernicious anæmia.	Low.	1	2	2·7	5·4 (*d*)
J. J.	Gardener.	Sprue-like diarrhœa, and nutritional œdema.	Fair.	2	2	2·9	3·8 (*b*)
B. M.	Housewife.	Pernicious anæmia of pregnancy.	Low.	1	2	3·2	2·5 (*a*)
T. H.	"	Hypochromic anæmia (and ? subacute combined degeneration).	"	3	3	3·5	7·3 (*g*)
E. C.	Miner.	Idiopathic hypochromic anæmia.	—	1	1	3·8	4·0 (*c*)

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TABLE VI—POLYNEURITIS, "NOT PRIMARILY NUTRITIONAL," MARCH, 1936–FEBRUARY, 1937
(Tables arranged in ascending order of resting levels)

Inits.	Occupation.	Diagnosis (apart from polyneuritis).	Nervous lesion.	Diet.	Urine tested (days).		Vitamin B_1 excreted (I.U.).	
					For resting level.	For test dose.	Resting level.	After test dose.
P. H. A.	Ex-clerk.	Gout.	Foot-drop.	Low.	3	3	1·2	3·0 (*f*)
P. F.	Publican.	Nephritis, uræmia (terminal).	Wrist-drop.	Good.	3	3	1·8	2·8 (*b*)
M. J.	"	Hypertension.	Wrist-drop (2 years).	Fair.	3	3	1·9	10 (*f*)
C. H.	Saddler.	Progressive polyneuritis.	Upper and lower limbs.	Moderately good.	1	2	3·5	11 (*b*)
S. W.	Old age pensioner.	Diabetes.	Jerks absent.	Low.	3	3	4·3	11 (*b*)
C. G.	Woodman.	Lead neuritis and anæmia.	Finger-drop.	Fair.	3	3	4·6	10 (*f*)
O. G.	Brewers' drayman.	Local neuritis, hypertension, gastritis.	Wrist-drop (2 years).	"	1	2	5·7	6·3 (*f*)
E. W.	Grocer	Diabetes, pulmonary tuberculosis.	Wrist-drop, foot-drop.	Good.	2	3	11	18 (*f*)

TABLE VII—POLYNEURITIS "OF NUTRITIONAL ORIGIN" MAY, 1936–JANUARY, 1937

P. S.	Cycle-maker.	Faulty gastro-enterostomy with stasis.	Severe generalised poly-neuritis with amnesia.	Very low.	1	2	0·4	0·6 (*b*)
C. J. B.*	Housewife.	Alcoholism with Korsakoff's syndrome.	Foot-drop, mental changes.	Low.	1	1	0·8	2·4 (*f*)
N. C.	Turner.	Gastro-enterostomy, hypochromic anæmia.	Loss of knee- and ankle-jerks.	Moderate.	1	2	1·6	9·8 (*f*)
H. A.	Housewife.	Polyneuritis of pregnancy.	Wrist- and foot-drop, &c.	Low.	2	2	1·8	2·3 (*e*)
B. G.	Miner.	Carcinoma of stomach, pyloric stenosis, gall-stones.	Chiefly peronei.	"	1	2	3·6	4·4 (*b*)
(G. J.)	(Seagoing.)	(Gastric ulcer, convalescent after beri-beri.)	(Had had beri-beri in far East.)	"	(1)	2	(6·0)†	2·1 (*b*)

* Incontinent; urinary excretion of B_1 calculated for 1500 c.cm.
† Value after recovery; not included in calculations and summaries.

non-irritating" type.† (3) In some instances, especially in gastro-intestinal disease, faulty absorption or assimilation of the vitamin may also have to be reckoned with. (4) Particularly when there is fever, the raised metabolism, and wasting of body tissues probably entail an increased destruction of vitamin B_1 (the same is true of other dietary essentials, certainly of vitamin C,‡ and probably of vitamin A).

This finding of a low value for the vitamin-B_1 "reserves" in many medical cases seems to be one of the most significant findings in the present work. Taken with the results of earlier investigations on vitamin C, and also on vitamin A, it suggests that a condition of multiple *partial* vitamin-deficiency is not infrequently associated with the state of poor nutrition characteristic of so many diseased states. The need for more special attention to be devoted to specific vitamin requirements during disease and in convalescence will assuredly be recognised more and more as time goes on.

Polyneuritis and certain "conditioned deficiency diseases."—The lowest average ranges of values among the various patients examined in this country were those in the groups described as polyneuritis of nutritional origin, the excretions being as low as those found in cases of beri-beri undergoing treatment at Singapore. The typical resting level of excretion was less than one-tenth of the normal figure—viz., below 2 as compared with 22 I.U. Values nearly as low were found in "other conditioned deficiencies," as well as in several cases of "polyneuritis not considered to be primarily of nutritional origin."

It seems very significant that values below about 3·5 I.U. (resting level) were found only in cases of beri-beri, "polyneuritis of nutritional origin" and "other conditioned deficiencies" and were not seen in the other groups (apart from three out of eight cases of polyneuritis which *on clinical grounds* had been considered to be "non-nutritional"). All the cases of beri-beri examined, all those of "nutritional polyneuritis," and all the "conditioned deficiencies" fell into place *below* this arbitrary border-line (or on it), whereas all the normal controls, all the surgical controls, and the "miscellaneous medical cases" were *above* it (see Fig. 1).§

We do not pretend to attach any absolute numerical significance to this figure of 3·5, and quite possibly more precise determinations than we have so far attempted will bring with them the need for some revision of its actual magnitude; but none the less, in a general qualitative way, the division of cases seems unmistakable. Similarly with regard to test doses, negligible responses were the usual feature of the cases of nutritional polyneuritis and "other conditioned deficiencies," but not of the other groups. (This is better shown in Fig. 2.)

A further point of importance seems to be that the characteristic excretions for "other conditioned

† The usual hospital diet, in the present instance, had the following composition:—
Breakfast: bread and butter; tea; one egg occasionally.
10 A.M.: soup or Bovril.
Noon: meat and potatoes, and rice pudding; sometimes fruit; fish is given on Friday instead of the above.
4 P.M.: bread and butter; tea; sometimes an egg; biscuits and possibly cake.
6 P.M.: milk, ½ pint.
8 P.M.: lemonade.
We have calculated that this contains considerably less than the reputed "desirable intake" of 600 I.U. per day (see later footnote in section headed "Standards").

‡ See papers by Abbasy, Harris, and Gray Hill 1936, 1937; Abbasy, Harris, and Ellman 1937; Harris, Passmore, and Pagel 1937.

§ It may be noted that the proportion of cases actually on or near this arbitrary border-line is not sufficient to invalidate the argument—viz., 0 out of 23 for the "normal controls," 0 out of 6 for the "surgical controls," 1 out of 5 for the "miscellaneous medical cases" (*otherwise all the foregoing are well above 3·5 I.U. per day*); 1 out of 5 for the "nutritional polyneuritis," 0 out of 7 for the "beri-beri," 3 out of 7 for other "conditioned deficiencies" (*others all well below*); and 1 out of 8 for "non-nutritional polyneuritis" (otherwise 4 are above and 3 are below).

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TABLE VIII—BERI-BERI DURING TREATMENT (SINGAPORE), SPRING, 1936

TABLE IX—CONTROLS TO BERI-BERI CASES (SINGAPORE), SPRING, 1936

(Arranged in ascending order of resting levels)

Init.	Urine tested (days).	Vitamin B_1 excreted (I.U.), resting level.	Init.	Occupation.	Urine tested (days).	Vitamin B_1 excreted (I.U.), resting level.
B	5	1·2	AA	Lab. asst.	3	12
D	5	< 1·6				
C	5	< 1·8	BB	"	3	14
F	5	2·0				
G	5	2·6	CC	Res. worker.	3	17
A	5	2·9				
E	5	3·0				

deficiencies"—i.e., without symptoms of polyneuritis—while very low, were not quite so low as for definite symptoms of "polyneuritis of nutritional origin"—of the latter all but one fell below 2 I.U. daily and of the former all but one above 2 I.U. daily. The average for the "other conditioned deficiencies" was 2·8 I.U. and that for "nutritional polyneuritis" only 1·6 I.U.

The relatively low figures for "other conditioned deficiencies" might perhaps have been anticipated—since a condition causing faulty absorption or utilisation of one factor will probably interfere to some extent with that of others. One has only to recall that alcoholism may be the cause both of pellagra and of vitamin-B_1 deficiency, and that achlorhydria often produces unsaturation with respect to vitamin C as well as other symptoms of deficiency, to realise that conditioned partial deficiencies are likely to be multiple.

The results with "non-nutritional" polyneuritis need rather more careful discussion:—

CLASSIFICATION OF VARIOUS TYPES OF POLYNEURITIS

Recent work goes to show that polyneuritis as a result of a dietary or "conditioned" deficiency of vitamin B_1 may occur in alcoholism (Strauss 1934, Jolliffe et al. 1936), and in pregnancy (Strauss 1934, Fouts et al 1934, Sze 1934, Theobald 1936, Widenbauer 1936), and probably in certain other conditions. The syndrome has followed prolonged anorexia, vomiting and diarrhœa in a patient with pernicious anæmia (Ungley 1938), and has been observed as a complication of certain gastro-intestinal disorders—where absorption or utilisation of the vitamin is probably at fault. The cases here described as "probably of nutritional origin" appeared clinically to fall into this classification—i.e., as due to dietary and/or "conditioned" deficiency—and the low values for vitamin-B_1 excretion accord with this impression.

A noteworthy finding is that several of the cases of polyneuritis in the group classified on clinical grounds as "not primarily of nutritional origin" gave as low values as certain of those in the group just mentioned which were considered to be "probably of nutritional origin." One might be tempted to suggest, on the basis of this finding, that the conception of a conditioned deficiency of vitamin B_1 may need extending, and that perhaps a greater number of cases of polyneuritis are due fundamentally to a conditioned or secondary deficiency than is now generally recognised. Arguments could be advanced both for and against this view. Thus on the one side it may be recalled that Vorhaus, Williams, and Waterman (1935) in their recent work on the treatment of neuritides with massive doses of vitamin B_1 claim to have effected cures in many types of neuritis which according to current ideas would not be accepted as related to vitamin-B_1 deficiency. Again, Ritchie Russell (1936) noted improvement in a case of chronic progressive polyneuritis treated with injections of vitamin B_1.

TABLE XI—SUMMARY OF REPRESENTATIVE VALUES

(Arranged in descending order)

—	—	Average amount of vitamin B_1 excreted (I.U.) per day (with range of values).	
		Resting level.	After test dose.
1	Normal controls.	20 (12–35)	50 (36–76)
2	"Surgical controls" (poor class, industrial area).	8 (4–12)	14 (8–20)
3	"Miscellaneous medical cases."	5 (4– 6)	—
4	Polyneuritis, "not primarily nutritional."	4 (1–11)	9 (3–18)
5	Conditioned deficiency diseases other than polyneuritis.	3 (1– 4)	4 (3– 7)
6	Polyneuritis "of nutritional origin."	2 (0·4– 4)	3 (0·6–10)
7	Beri-beri under treatment.	2 (1– 3)	—

On the other side of the argument, however, there are certain facts to be borne in mind. For example, the "non-nutritional" cases of polyneuritis—in the present series at least—presented clinical pictures distinctly different from those generally found in "nutritional" polyneuritis, and it would require strong evidence to convince the clinician that vitamin-B_1 deficiency played a part in their causation. Again, the excretion of vitamin B_1 in these cases was not on the average significantly different from that in the "miscellaneous medical cases"—although it is true that in at least three cases it fell to a level which has only been found otherwise in association with beri-beri, nutritional polyneuritis or "other conditioned deficiencies." This latter observation raises the difficult question of standards, which is discussed further below. It will be understood in the meantime, however, that while "normal" figures for urinary excretion are strong evidence against the existence of vitamin-B_1 deficiency, low figures afford no justification in themselves for

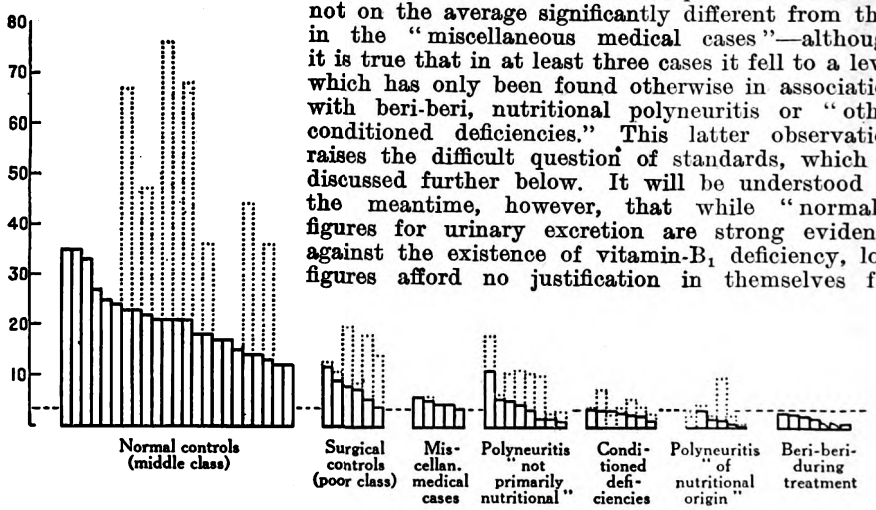

FIG. 1.—Resting levels of excretion of various groups of subjects. (Dotted columns represent the corresponding responses to test doses—which are seen to follow in approximately the same order by groups.) Values under about 3·5 I.U. (resting level), marked by the broken horizontal line, have only been seen in cases of beri-beri, polyneuritis, and certain "conditioned deficiencies" other than polyneuritis.

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concluding that the disease from which the patient suffers is necessarily the result of the vitamin-lack. A final difficulty is that even when improvement of symptoms and signs are seen in a patient suffering from polyneuritis during the treatment with vitamin B_1, this is not necessarily in itself evidence that the condition is related to vitamin deficiency; for it is characteristic of polyneuritis that it tends to improve spontaneously. If, after a suitable control period during which improvement has been slight or absent (as in the tests of Vorhaus et al. 1935), the administration of vitamin B_1 is then followed by a rapid and dramatic effect, one may be justified in drawing tentative conclusions. Unfortunately, unlike certain other workers, one of us (Ungley 1937) has rarely observed such clear-cut effects from vitamin-B_1 therapy. Even cases which were considered clinically to be nutritional in origin have often improved only very slowly, despite the prolonged administration of vitamin B_1 by mouth and by injection (500-5000 I.U. daily). The slow response may possibly have been partly due to the severity and duration of the lesions in the peripheral nerves or to deficiency of factors other than vitamin B_1. But in view of the known tendency of polyneuritis to improve spontaneously this lack of dramatic effect rendered it extremely difficult to assess the value of the treatment. Obviously much further work is necessary before the rôle of vitamin-B_1 deficiency in various types of polyneuritis can be accurately assessed.

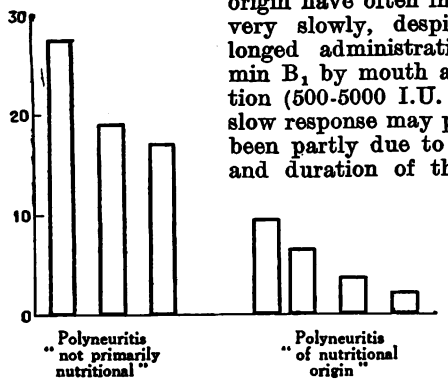

FIG. 3.—Excretion of vitamin B_1 after continuous treatment with massive doses of the vitamin. Comparison of "nutritional" and "non-nutritional" polyneuritis.

Probably one method of attacking the problem is to compare the excretion of vitamin B_1 after intensive treatment with the vitamin. In cases of polyneuritis of a truly nutritional origin, especially when there is a state of conditioned deficiency arising from faulty absorption or utilisation, a long delay in the attainment of a normal rate of excretion may reasonably be expected. Work of this kind is now in progress, and the preliminary results seem very suggestive. Thus, in two cases of polyneuritis held to be of nutritional origin, and also in one case of a conditioned deficiency disease (sprue-like diarrhœa) there was a complete failure to reach a normal rate of excretion even after several weeks of treatment. In marked contrast, three cases of polyneuritis "not primarily nutritional" showed normal excretion after treatment. Admittedly the actual doses given and the time of treatment were not strictly comparable (see Table XII), but there appears to be no question of the difference in response between the two groups (Fig. 3). It seems therefore that a useful method of attack on the problem for the future will be to compare the effects of repeated test doses ("saturation" tests) on the various types of polyneuritis. Where faulty absorption is suspected to be the cause of conditioned deficiency, the effects of the vitamin given by mouth and by injection should also be compared.

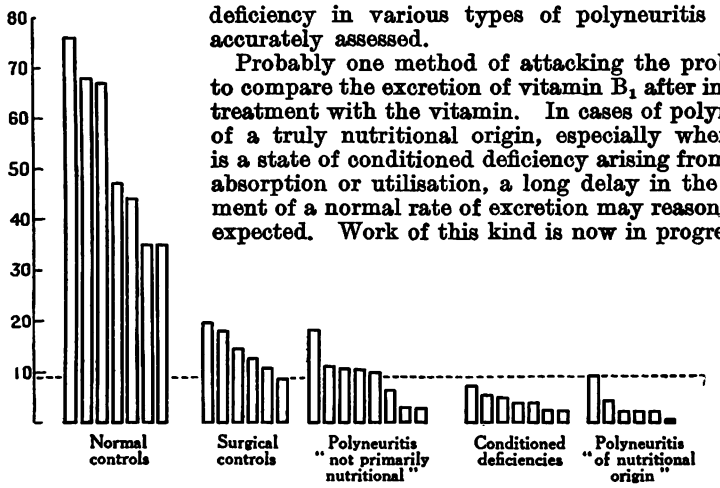

FIG. 2.—Effect of test doses "arrayed" in order for the different groups (cf. Fig. 1).

Even with the cases of "non-nutritional" polyneuritis (Table XII) the final rate of excretion seems less high than might normally have been anticipated, considering the extremely intensive nature of the treatment. It may be that later work will show that the difference between "nutritional" and "non-nutritional" polyneuritis is sometimes one of degree rather than of kind.

TABLE X—ANALYSIS OF RESULTS

Cases examined.		Description.	Excretion of vitamin B_1 (I.U. per day).					
			Resting level.			After test dose.*		
For resting level.	For test dose.		Range.	Median.	Average.	Range.	Median.	Average.
10	7	Normal controls, Cambridge and London, 1936.	12–35	21	21	36–76	47	52
10	0	" " " " 1937.	15–35	22	23	—	—	—
3	0	" " Singapore, 1936.	12–17	14	14	—	—	—
6	6	"Surgical controls" (poorer diet), 1936–37.	4–12	8	8	8–20	13	14
5	1	"Miscellaneous medical cases."	4– 6	5	5	6	—	—
8	8	Polyneuritis, "not primarily nutritional," 1936–37.	1–11	4	4	3–18	10	9
7	7	Conditioned deficiency diseases (not including polyneuritis).	1– 4	3	3	3– 7	4	4
6	6	Polyneuritis "of nutritional origin."	0·4– 4	2	2	0·6–10	2	3
7	0	Beri-beri undergoing treatment.	1– 3	2	2	—	—	—

* As the responses were of the same order for the several levels of test dose, they are not indicated separately.

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The significance of subnormal vitamin-B_1 reserves in the absence of symptoms of polyneuritis is alluded to again below.

STANDARDS

The fixing of *standards of normality and deficiency* is attended with some difficulty; but it would seem that the following provisional recommendations can be justified.

Determinations should be made both of resting level (based on an average of 2–3 days separate determinations) and of the response to two or more standard test doses of 350 I.U.—i.e., for an adult of 10 st. body-weight, and in proportion for children.

TABLE XII—EXCRETION OF VITAMIN B_1 DURING TREATMENT

Init.	Diagnosis.*	Treatment: Daily dose, how given, duration.	Daily excretion after treatment (I.U. per day).
M. J.	Polyneuritis not primarily of nutritional origin.	1000 I.U., injection, 2 months.	17
P. H. A.		500 + 500 I.U., injection + mouth, 3 months.	19
O. G.		Bemax 60 g., mouth, 2½ weeks.	27
P. S.	Polyneuritis of nutritional origin.	500 I.U., injection, 5 weeks.	3·6
B. G.†		500 I.U., injection, 6 weeks.	6·6, 8·4
J. J.	Sprue-like diarrhœa.	Marmite 60 g., mouth, 11 weeks.	2·2

* For further details see Tables V, VI, and VII.
† Twenty-five injections given in 6 weeks.

Standards of normality.—Judging from the numerous normal controls whom we have examined, it may be concluded that a resting level of from 10–20 I.U. and a response of upward of 30 I.U. after the first test dose imply average normal nutrition with regard to vitamin B_1. A resting level of less than 10 I.U., or an excretion of less than 15 I.U. after test dose, may be classified as subnormal, on the grounds of being sufficiently far removed from the average normal range of excretion, also as being below the excretion known to correspond with the generally accepted values for an optimum intake of vitamin B_1.‖

Our results show further that the cases of nutritional polyneuritis and beri-beri have had excretions of about 3·5 I.U. or below for their "resting levels" (as compared with values of 12–30 for the normals). It will be seen moreover that the cases of "nutritional polyneuritis" with one exception gave a negligible response to a test dose (and that in this one exception the response was below 10 as against a response of 35–75 in the normals).

Nevertheless, no sharp dividing line can yet be drawn between the level at which neuritic symptoms may appear and that judged to be just adequate for protection. In fact it is possible that no very sharp line exists. Certainly with experimental animals the dividing line is vague—that is, only a proportion of animals will develop definite polyneuritic signs on a diet partially deficient in the vitamin. In case it might be argued that a standard for subnormality such as we have suggested is unjustified, when no clearly defined clinical symptoms or more obvious ill effects are necessarily associated with it, the following consideration must be kept in mind. In the first place, it has been repeatedly found in animal experiments that increases in the allowance of vitamin B_1 to levels far above those needed for protection against actual symptoms of a deficiency disease still produce a beneficial effect, as shown by improved growth-rate, weight gains, longevity or physical performance. For example 1–2γ of crystalline vitamin B_1 per day will protect rats from polyneuritis, but increases of 1–100 times this quantity induce progressively greater gains in weight. Secondly, tests on human beings (mostly on infants or children) have repeatedly indicated that the addition of extra vitamin B_1 to an "average" institutional diet brings about such benefits as improved appetite, increased weight gains, and possibly strengthened gastro-intestinal tone, even when no apparent disease was associated with the lower intake (see Daniels et al. 1922, Bloxsom 1929, Gayner and Dennett 1934, Dennett 1929, Cowgill 1932, Hoobler 1931, Summerfeldt 1932, Ross and Summerfeldt 1935, Crimm et al. 1933, Brown et al. 1934). Hence, whenever the urinary excretion indicates that the dietary intake of a given individual is below the figure corresponding with the reputed optimum, one seems justified in applying the description subnormal to such an individual. Similar conditions apply with other "partial deficiencies." For example with vitamin C it has frequently been shown that the symptoms of latent scurvy in children are so vague as to be difficult of diagnosis; the only certain proof of the existence of (and importance of) the sub-scurvy state is the striking improvement in growth and well-being when extra vitamin C is given (see, e.g., Friderichsen 1934, Frölich 1935).

Standards for "marked deficiency."—There seems little doubt that in an advanced state of avitaminosis the most accurate quantitative indication of the extent of the deficit can probably be obtained by determining the number of repeated test doses which have to be given before the subject finally reaches a state of *stable* saturation at a normal level of excretion (cf. Harris and Leong 1936). This technique follows that used for the determination of vitamin-C deficiency (see Harris and Ray 1935, Harris 1935, Abbasy, Harris, and Gray Hill 1937, &c.). As has been pointed out above, it seems significant that in polyneuritis of nutritional origin, every case but one gave a negligible response (and this one case was below the minimum level of 10), while in non-nutritional polyneuritis higher responses were generally seen (Fig. 2). The difference is more clearly shown after repeated doses (see Fig. 3). More work will be needed before these detailed numerical relations can be put on a strictly quantitative basis. As we said at the beginning of this paper our object here has been rather to obtain "round values" characteristic of the several groups. While therefore some uncertainty still remains as to the total extent of the deficit which may be met with in cases of advanced deficiency—i.e., as measured by the degree of unsaturation with repeated test doses—we are certainly entitled to conclude that subjects having an excretion of upwards of 10 I.U. (resting level) and a normal response to test dose may safely be regarded as free from deficiency.

Resting level for "marked deficiency."—As previously noted, almost without exception, cases of beri-beri, polyneuritis of nutritional origin and "other conditioned deficiencies" have shown *resting levels* of 3·5 or below, while the normal controls, surgical controls, and "miscellaneous medical cases" have been above this arbitrary standard. A few cases of polyneuritis which had been adjudged clinically

‖ For calculations as to the probable optimum vitamin-B_1 requirements of man see Baker and Wright 1936; Baker, Wright, and Drummond 1937; Cowgill 1921; Jung 1932; Salter 1934; Géronne 1934; Jusatz 1935. Baker, Wright, and Drummond 1937, after a careful consideration of past clinical literature, consider the "physiological minimum" to be 300 I.U. per day. This corresponds according to our experiments with an excretion of approximately 20 I.U. (see Harris and Leong 1936). The "desirable intake," however, according to these authors, is 600 I.U. daily; at this rate of intake the excretion is about 40 I.U. daily (Harris and Leong 1936).

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to be of non-nutritional origin were below and the remainder were above this presumptive border-line. Further tests are needed to see how far this provisional figure can be applied as a consistent standard.

A still more stringent standard—viz., *under 2 I.U.*—would have the advantage of including (with one exception) all the cases of polyneuritis of nutritional origin while excluding (with one exception) all those of conditioned deficiencies not accompanied by actual symptoms of polyneuritis.

SUMMARY

In continuation of earlier work (Harris and Leong 1936), in which it was shown that the excretion of vitamin B_1 was graded according to the past dietary intake, further data are given for various classes of subjects.

Normal well-nourished controls—middle-class persons at Cambridge, London, and Singapore—excreted on the average about 20 I.U. per day (average 22, range 12–35 I.U.)

A group of "surgical" cases, who came from a lower social class in a poor industrial area and most of whom were known to have been on diets low in vitamin B_1, excreted only one-third of the above "normal" figure (average 8, range 4–12 I.U.).

Somewhat lower values still were seen in a group of miscellaneous medical cases (average 5, range 4–6).

The lowest figures of all—viz., excretions of 3·5 I.U. *and under*—were the cases of (*a*) beri-beri, and (*b*) polyneuritis of nutritional origin (average 1·6), and the next lowest those of (*c*) other conditioned deficiencies (average 2·8). Low values were also seen (*d*) in a proportion of the cases of polyneuritis which had been judged on clinical grounds to be not primarily of nutritional origin.

Responses to test doses were approximately parallel with the "resting levels" and served to confirm the separation into the foregoing categories.

It is concluded that the urinary excretion furnishes a useful guide to the state of nutrition of the subject with regard to vitamin B_1.

The low values so often found in medical cases may probably be attributed to one or more of the following causes: (*a*) anorexia, (*b*) poor hospital diets, (*c*) raised metabolism (especially in fever) and wasting of body tissues, (*d*) faulty absorption or utilisation. The importance of providing specially nourishing food during illness and convalescence is emphasised by these results.

The following provisional standards are suggested—

A "resting level" of excretion of 10–20 I.U. and a response of upward of 30 I.U. after the standard test dose (350 I.U.) implies average normal nutrition. Excretions of less than 10 I.U. (resting level) and 15 I.U. (after test dose) seem sufficiently removed from the average range, or from the excretion corresponding with the *reputed optimum requirements*, to be classified as subnormal. Polyneuritic symptoms of nutritional origin have been found to be associated with resting levels of 3·5 I.U. and under (or below 2½ I.U. in 4 cases out of 5), and with low responses to test doses.

Probably with the more advanced state of avitaminosis, the most accurate indication of the degree of the deficit can be obtained by a determination of the number of repeated test doses which are needed before "saturation" is finally brought about at the normal level.

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A CASE OF ONCHOCERCIASIS (FILARIAL BLINDING)

WITH MANIFESTATIONS DEVELOPING IN BRITAIN

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CASE REPORT

IN December, 1936, an application was received from a man aged 34 for admission to the ward of the Liverpool School of Tropical Medicine. He complained of eye trouble which he said developed in 1934, shortly after his return from a sojourn in Africa. On his entering hospital the following material facts relating to his peregrinations and history were obtained. He was vague about dates in several details, and he even found considerable difficulty in accounting for periods of time up to a whole year; but by cross-checking information obtained from other sources a fairly reliable sequence of events was ultimately established.

PREVIOUS HISTORY AND MEDICAL HISTORY

He was born in England in 1903, and educated in this country. He spent 1925–27 in Canada and Australia, returning to England. In 1929 he travelled to Cape Town by sea, and then to Northern Rhodesia, stopping at various places en route. He was employed in a mine in Northern Rhodesia near the Congo border until January, 1931, when he travelled north by car along the Congo border to Tanganyika; during this trip he often went over the border into the Congo at the week-ends on shooting expeditions. He then went through Kenya, and started prospecting to the north of Kisumu. In January, 1934, he set out for Europe by car via the Sudan, Egypt, Palestine, Turkey, along the Danube to Germany, finally reaching England in June, 1934.

Close inquiry into his medical history yielded the following relevant information. June, 1930–January,

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1931: While working on the mines he was continuously on night-shift, which he thinks did not suit him. He lost weight and condition, and developed persistent "veld sores" on both legs. He also fell about 180 ft. down a steep incline and was cut about the head. The wounds refused to heal, and this fact, together with the "veld sores" and his general ill health, determined him to start his trading venture along the Congo border. He rapidly recovered his health at this work, and the sores and festering wounds healed in a short time.

May, 1932: When prospecting in Kenya he was reduced to very low financial circumstances, and "lived native" for about a year. His diet consisted of beans, green bananas and sweet potatoes, and a small quantity of meat once a week. He was fit throughout this period, but towards the end of it he developed "veld sores" which became infested with "fly maggots." He removed these mechanically and the sores quickly healed. While on this native diet he suffered at times from some attacks of acute abdominal pain which doubled him up, but these attacks lasted only some hours.

April, 1933: As a result of hard physical work on a mine he began to lose condition again, and developed further "veld sores." He also had an attack of what he called "scurvy," but there seems little doubt that the infection was scabies. Shortly after this he had an attack of malaria, for which he was treated with quinine, and he was also given three injections of Fourneau 914 as a tonic and for his "veld sores," which were still troublesome.

January, 1934: He set out for Europe with some companions by car. In Egypt he had an attack of what clinically seems to have been bacillary dysentery, which lasted ten days. While near the Mediterranean coast he decided to take a trip to Cyprus, and during his stay there, while he was sitting on the shore watching for a boat with his companions, he noticed that he could see better with one eye than with the other; but he attached no significance to this.

June, 1934: On his arrival in England, a relative drew attention to the fact that his eyes were bloodshot. He attributed this to wind and sun on the journey, but the condition failed to clear up as he had expected. Within a few weeks he was conscious of some difficulty in looking upwards, as the light hurt his eyes, and about five weeks after his arrival he was troubled with pain and watering in the left eye, which he thought was due to the presence of some foreign body. For a week he had pain and discomfort, which became worse; and the other eye then began to trouble him.

August, 1934: Examination of an object visually caused smarting in the eyes and lacrymation; reading became impossible for long periods, and there was much photophobia. He became seriously alarmed and consulted an ophthalmic surgeon, who has kindly informed me that at this time there was keratitis of both eyes and numerous spots on each cornea, which did not seem greatly to interfere with vision. General treatment was given, which afforded some temporary relief.

September, 1934: Acute abdominal pain and a diagnosis of appendicitis led to admission to a London hospital, where the vermiform appendix was removed. During convalescence his vision began rapidly to fail, and he noticed that he could no longer read the numbers over the beds on the other side of the ward, which had been decipherable on his admission. He could not read news-print for more than a few seconds at a time and photophobia became severe. He could not tolerate a light near his eyes, even with the lids shut. Any attempt to look upwards caused him extreme pain and discomfort, and his eyes were acutely injected and inflamed. On leaving this hospital, he sought advice from various ophthalmic surgeons, without other than temporary relief; but the exceedingly acute inflammatory state of his eyes gradually subsided to a subacute and, later, chronic condition.

January, 1935: An attack of fever led to admission to a hospital for tropical diseases, where he was found to have simple tertian malaria. This was treated; and while in this hospital it was found that he was infested with *Ascaris lumbricoides*, half a dozen worms being removed by an anthelmintic. The eye condition was attributed to some nutritional factor, and measures considered appropriate were taken to relieve it, without much effect.

April, 1935: In view of the persistence of the eye discomfort he again sought admission to hospital, and a skin test for filariasis gave a doubtful positive reaction. A complement-deviation test for filariasis showed that his serum at that time fixed 20 minimum hæmolytic doses of complement against a filarial antigen. The Wassermann reaction was negative; no parasites of any kind were found.

May, 1935: A hæmatologist examined him and discovered a 40 per cent. eosinophilia; while under his care the patient had a transient swelling over the right shoulder, the size of a pigeon's egg, which lasted only about twenty-four hours. A tentative diagnosis of filariasis was made from this, and he was put on a course of Neostibosan, with a total dosage of 9 grammes. This, I am informed, caused the eosinophilia to drop to about 5 per cent., and the patient is very positive that after the third injection of the course the eye condition rapidly started to improve, and that he was able to visit a cinema and enjoy the performance for the first time for many months. The drop in the number of eosinophils, however, proved to be only temporary, and the percentage steadily rose until it reached the original figure within a few weeks. The eyes, although no longer acutely painful and inflamed, remained defective in vision, and the patient then began another round of ophthalmic surgeons, both in this country and on the Continent, without either a definite diagnosis being reached or any material benefit resulting. He approached this institution as one of the few he had not already consulted.

PHYSICAL EXAMINATION

In January, 1937, he was admitted to the tropical ward of the Liverpool School of Tropical Medicine.

He was a robust, muscular, and intelligent man of equable temperament. His general physical condition was excellent. On full clinical examination nothing abnormal was found, with the exception of eye lesions and a high eosinophilia. No malaria parasites were seen in the blood; the spleen was not enlarged; no parasites of significance were found in the stools; the urine was normal; and no calcified patches could be seen in the musculature on X ray examination. The Wassermann reaction was completely negative. On most careful and repeated search, both by the patient and his attendants, no skin lesions or subcutaneous nodules were found.

Blood.—Several counts were made, and the following figures are those obtained by averaging three counts done on one day:—

Hæmoglobin	90%	White cells	6800
Red cells	5,300,000	Polymorphs	33·3%
Colour-index	0·85	Lymphocytes	30·0%
Halometer size	7·02μ	Monocytes	3·3%
		Eosinophils	33·0%
		Basophils	0·3%

No abnormal cells were found. There was a slight degree of hypochromia of the red cells.

Eyes.—Mr. McKie Reid was asked to examine the eyes, and reported that there were areas of opacity in both corneæ, that these areas were small and multiple, and that they were situated over the pupillary apertures. The visual acuity of both eyes was obviously affected.

Specific examination.—Repeated investigation of the nocturnal and diurnal blood by various methods, including the centrifuging of considerable volumes, failed to yield any microfilariæ. Mr. McKie Reid was asked to remove a small piece of the bulbar

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conjunctiva of the left eye, and in this were seen nine microfilariæ, which on staining proved to be larval *Onchocerca volvulus*. Some four dozen snippings of skin from the face, neck, shoulders, and chest were examined at various times, and in three of these similar larvæ were found. Two were recovered from the right arm, and a single larva from the skin of the left side of the chest. Mr. McKie Reid was then asked to remove some aqueous fluid from the anterior chamber of one eye, and withdrew about 0·25 c.cm.; no parasites were found in it. Examination on two occasions with the slit-lamp showed parasites in small numbers, but a feature of this examination was the remarkable rapidity with which the larvæ removed themselves from the bright light required for the apparatus. Those seen could only be observed for a few seconds before they left the range of vision into the surrounding tissues with the greatest activity.

PROGRESS

The patient was in hospital under observation for about six weeks. Under simple palliative treatment by the eye surgeon, the ophthalmic condition improved steadily, and vision became more distinct. He left hospital, and nothing further was heard of him until October, 1937, when he was readmitted for a week for re-examination. At this time he appeared in robust general health, and his eyes were again examined by Mr. McKie Reid, who found that there was further improvement in visual acuity. Both eyes looked clear on ordinary examination, but slight opacity could be seen under proper illumination. With the slit-lamp no larvæ could be found, but snippings of both conjunctivæ yielded two or three. A few were also recovered from skin snippings from the arms and shoulders. The eosinophilia was about 32 per cent.

The finding of the larvæ, and their identification, established beyond doubt the nature of the condition; and a study of the published work on onchocerciasis emphasises the interest of the case, and the possibility of the occurrence of similar cases in Europe. So far as I have been able to find, the present is the first case of this nature to be recognised and recorded in this country.

OBSERVATIONS ON THE DISEASE

Onchocerciasis is a form of filariasis known to occur in West Africa, the Congo, Uganda, the Sudan, the Cameroons, and Senegal. It also is found extensively in Central America and the adjoining parts of the North and South American continent. Flies of the genus *Simulium* (buffalo gnats, black flies, &c.) are the vectors of the parasite, and these insects breed in swiftly flowing waters. From 40 to 100 per cent. of the population of the endemic areas have variously been reported as infected with *O. volvulus*, and the infestation is usually associated with fibrous nodules in the subcutaneous tissues, either single or multiple, which are present more particularly over bony parts of the body. These nodules each contain several adult worms of both sexes; the gravid female worms give birth to larvæ that migrate from the tumours to the superficial layers of the skin, from which they may be recovered in thin shavings of the epidermal layers. They are particularly numerous around the tumours, but wander widely over the body and can be found in lesser numbers some considerable distance away from them. Puncture of a nodule and aspiration of tissue fluid from it is a means of obtaining large numbers of larvæ.

In Central America it was found that onchocerciasis was extensively associated with blindness, and that in that part of the world the nodules occurred in over 90 per cent. of all cases on the scalp. In Africa nodules are rarely met with on the head; the vast majority being found at a level below the shoulders. The Central American parasite is there popularly known as the "blinding filaria," and has been given the name *Onchocerca cæcutiens* by Brumpt; but, as the belief is now general that there is no specific morphological or biological difference between *O. volvulus* of Africa and *O. cæcutiens* of America, the latter name has been dropped. Where there are nodules on the upper part of the body, especially on the head, the microfilariæ are liable to invade the eye tissues and give rise to eye defects and blindness. That this is the case in Africa as well as in America has been shown by observations made by Hissette (1932) in the Katanga province of the Belgian Congo. He observed that in certain districts onchocercial head nodules were common and that these were associated with blindness. He believed the causative parasite to be the usual African *O. volvulus*, and his findings were subsequently confirmed and extended by the members of an expedition from Harvard University, who had already investigated the situation in Guatemala (Strong and others 1934). The members of this expedition had already noted in America that in a certain small proportion of cases of onchocerciasis there was no demonstrable nodule formation. These they had referred to as carriers, but they also noted that some of them developed eye changes. Hissette records, however, that in almost every case which he has seen in Africa he has on very careful search been able to find some nodules; but that these may be exceedingly small (0·82–2·5 mm.) and therefore readily overlooked. He also confirmed the previous workers' observation that the great majority of those persons with eye changes have nodules on the head region. By all workers it is agreed that when eye complications develop they do so insidiously and late in the infection.

Treatment consists of the mechanical removal by surgical means of the adult worms. Excision of the nodules and their contained worms under local anæsthesia is simple and effective. No known drug administered by conventional routes will destroy the adult worms, but the larvæ can be killed by certain antimony compounds, and also by Plasmochin and possibly by other organic preparations Their destruction is not of permanent value, as they are rapidly replaced by fresh supplies of larvæ from the mature adult worms, which are unaffected by such drugs.

DISCUSSION

There seems to be little reasonable doubt that the man whose history is here recorded became infected between 1929 and 1931 when he was in the neighbourhood of the Katanga province of the Belgian Congo. The case is of particular interest, because it is one of those in which there were no nodules to assist in a diagnosis. The complete lack of symptoms and signs until eye trouble insidiously developed in 1934, after his return to Europe, fits into the clinical picture of filarial blinding. The fact that a course of neostibosan arrested the progress of the eye trouble in the acute stage is readily explicable by the known action of such compounds on the microfilariæ. And the reduction in the number of eosinophils as a result of this medication, and their subsequent increase in number, show how ephemeral the treatment is, as well as its complete lack of effect on the all-important adult worms. At present the eye condition appears to be stationary, and for the last twelve months there has been no evidence of progress in the damage which the eyes have sustained. There is little indication, therefore, for the administration of drugs

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to destroy the existing microfilariæ. If, however, further eye changes occur, it may be advisable to give antimony or plasmochin with the specific object of destroying those larvæ that are actually causing the damage. Failing the removal of the adult worms, the actual location of which is impossible in the absence of nodule formation, no radical measures can be taken to eradicate the infection. It is impossible to say for how long the possibility of further complications may continue, as it is known that in many cases these worms live for a considerable number of years.

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A MECHANICAL BLOOD-PIPETTE SHAKER

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THE blood count is an estimation unfortunately beset by a host of possible errors. Inefficient mixing of the diluted blood in the pipette is an important, if easily avoidable, example. Without perfect mixing, the sample transferred from the pipette to the counting chamber is not likely to be representative, nor the distribution of the cells in the chamber itself an even one. Counting pipettes, therefore, are always shaken for at least three minutes as a routine in this laboratory. The fact that this procedure is time-consuming and tedious when many counts have to be done led Dr. Janet Vaughan to suggest that this part of the routine should be taken over by a machine. Although various types of pipette-shakers were on the market, none of them appeared to satisfy our requirements, which were as follows:—

1. That six pipettes, if necessary, could be shaken at once.

2. That any one of these pipettes could be started or stopped without interfering with the movement of the others.

3. That the machine should be simple, cheap, and above all, quiet.

The second condition was necessary because several workers would want to use the shakers, and obviously this independent control of each pipette was the main difficulty in the design, particularly when taken in conjunction with the conditions, simplicity and cheapness. However, the problem was solved, and the machine made to my drawings, by the Progress Manufacturing Company of Camden Town; costing about £15 complete. It has been working daily for the last eight months without the least trouble, and with a remarkable saving of time. Since other laboratories might find it equally useful, I append two sketches, drawn to scale, from which the main features in its construction can readily be followed. Mechanically it is quite simple, the only difficulty in its production being springs of the appropriate tensions. The machine is almost silent, and the base is supported on rubber blocks so that no vibration is transmitted to the bench.

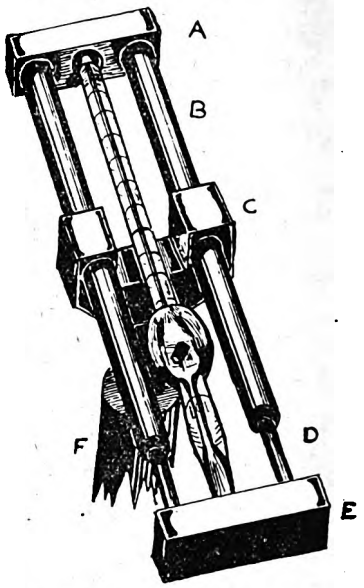

FIG. 2.—*A pipette-holder* The end-plate E is mounted on the two rods (D) which are free to slide in the tubes (B) and are drawn inwards by spiral springs. Any length of pipette (within reason) may be clipped between A and E, engaging in rubber padded recesses. During shaking each holder travels over a 2 in. arc, changing direction 480 times a minute. The curvature of its path increases the efficiency of the mixing.

In order to test the efficiency of the apparatus as compared with shaking by hand the following experiment was made:—

Four hæmocytometer pipettes A, B, C, and D were filled from the same drop of normal blood. A, B, and C were shaken vigorously to and fro by hand for 1 min., 2 mins., and 3 mins. respectively. D was shaken for 3 mins. on the machine. Immediately after shaking a count was made from each pipette, using the same Bürker hæmocytometer. The whole process of shaking and counting was repeated until ten counts had been made from each pipette. Two drops of diluted blood were discarded from each pipette before each filling of the counting chamber. In each count the red cells in nine sections were counted. This area, in a count of 5,000,000 cells per c.mm., contains about 1140 cells. Since the sections are scattered over the whole ruled area of the counting chamber the individual totals will reveal uneven distribution of the cells, while the mean of the nine sectional totals

*Assisted by a grant from the Medical Research Council.

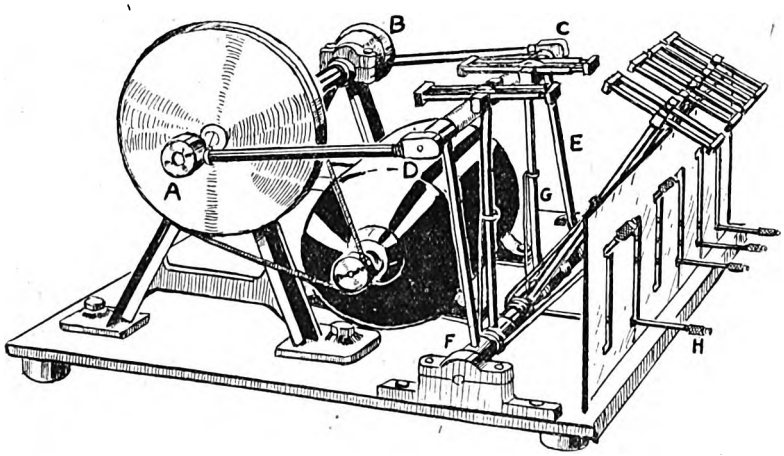

FIG. 1.—*The shaker.* The rod C–D is made to oscillate about the shaft F by the cranks A and B. The six pipette-holders pivot about the same axis. Any holder may be held in contact with C–D by a spring, thus receiving its oscillation. This motion may be started or stopped by the movement of a lever, the holder being stationary when the lever is in the lower position, as shown at H.

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will be, to a certain extent, independent of this variation.

Some idea, therefore, can be obtained of the errors due to faulty sampling, which will be reflected in the mean counts, and of the errors due to uneven distribution, which will be shown by variations of the sectional totals in each count. Actually the former is the more important, since the routine erythrocyte

TABLE I—RED CELL COUNTS IN THOUSANDS PER C.MM. AFTER VARIOUS PERIODS OF SHAKING

Test.	Hand shaking.			Machine shaking.
	1 min.	2 mins.	3 mins.	3 mins.
1	5250	5180	5030	5080
2	5030	5020	5060	5170
3	5080	5080	4920	5010
4	4910	4920	4980	5040
5	4980	4840	4860	4850
6	4770	5100	5020	5260
7	5780	5000	5000	5200
8	5100	4930	4670	5040
9	4580	4440	4530	4880
10	4490	4740	4830	4890
Mean	4997	4925	4890	5042
Standard deviation	363	214	173	140
Coefficient of variation ..	7·28%	4·35%	3·54%	2·78%

count is arrived at from the mean of nine sections, in this laboratory, and as a further safeguard any count showing a variation of more than 10 cells between the sectional totals is discarded.

The ten counts in each of the four groups are shown in Table I. In this the results are expressed as cells per c.mm. of blood, calculated from the nine sectional totals in each count. The standard deviation of each group is given, arrived at from the formula $\sqrt{\frac{\Sigma (x-\bar{x})^2}{n-1}}$. These results show that shaking for 1 min. gives a much less reliable result than longer shaking, a difference that is technically significant. The progression of the standard deviations suggests that the most reliable counts are obtained after 3 mins. shaking on the machine, with 3 mins. by

TABLE II—VARIABILITY OF THE NINE SECTIONAL TOTALS IN EACH OF TEN COUNTS

—	Hand-shaking.			Machine shaking.
	1 min.	2 mins.	3 mins.	3 mins.
Mean of 90 sectional totals	125·27	123·44	122·21	126·00
Mean standard deviation within the ten counts	11·75	6·71	5·42	5·14
Mean variance within the ten counts ..	138·08	45·09	29·41	26·39

hand and 2 mins. by hand following in that order, though the differences are not technically significant.

In order to get an idea of the possible differences in distribution of the red cells in each field, the standard deviation of the nine sectional totals in each count was calculated. The mean of the ten standard deviations in each of the four groups was then obtained, this mean standard deviation being an index of the section-total variability within the counts. The results of this analysis are given in Table II. Again the trend shows that shaking for 1 min. gives the least reliable results, and that greater reliability is obtained as the period of shaking increases. There is no material difference between shaking by machine or by hand in this respect.

The experiment appears to suggest, therefore, that shaking for 3 mins. is necessary if reasonably accurate results are to be obtained. If the pipette is shaken for 1 min. only the standard deviation from a mean of nearly 5,000,000 is 363,000 cells. Taking the limits of error to be $\pm 2\sigma$, the variation may thus be $\pm$726,000 cells. If 3 mins. shaking is given, however, the standard deviation is reduced to 140,000 cells on a count of 5,000,000, giving, on the same basis, a variation of $\pm$280,000 cells. In addition to this, efficient shaking gives a more even distribution of cells in the field. Shaking on the machine is, if anything, more efficient than shaking by hand and certainly less trouble.

The statistical analysis, which has been deliberately kept as simple as possible, was made with the help and advice of Mr. A. Bradford Hill, D.Sc., to whom my thanks are due. I also wish to thank Mr. H. R. Davis and Mr. A. J. Henington for their drawings.

TREATMENT OF INFECTED WOUNDS WITH UREA

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THE protein solvent properties of urea were first investigated by Spiro (1900), and independently by Ramsden (1902). We can find no further mention of this subject until Symmers and Kirk (1915) reported on its bactericidal properties together with its use in the treatment of wounds. In spite of this article the use of urea for wound therapy has apparently enjoyed little popularity in this country. In America, however, it has recently been used for the treatment of various infected wounds by Robinson (1936) and by Holder and McKay (1937), who found it extremely efficient. Moreover, it is a substance that is readily obtainable in quantity and is both cheap and stable. For these reasons it was thought desirable to test its efficacy in the casualty department of the Royal Free Hospital.

Since every wound covered with slough or debris is a potential breeding ground for bacteria, the removal of such tissue deprives the bacteria of a medium in which to grow and thus prevents reinfection of the wound. To enable urea to act in this way it must be used in concentrated solution. Consequently the fullest use is made of its protein solvent powers which are exerted on all classes of protein. It is possible that a concentrated solution has a bactericidal effect. Wilson (1907), in experiments in vitro, states that in urea solutions of 8–25 per cent. there is no growth of bacteria, while stronger solutions are bactericidal. No toxic effects have been

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recorded even though the urea has been applied in solid form. We therefore decided to use both the saturated solution and crystals throughout.

TECHNIQUE

The procedure employed was as follows:—

The wounds were syringed free from pus and necrotic material with a saturated solution of urea, excessive moisture was removed, and the urea crystals were then liberally applied. Waxed paper was placed next to the crystals to keep them in contact with the wound and to prevent the dressings becoming soaked. This had the further advantage that it prevented the dressings from sticking to the raw wound surface. In all but very small wounds zinc cream was spread over the adjacent skin. This was used as a precaution, since some moisture will reach the surrounding skin however carefully discharging wounds are dressed.

INDICATIONS

For a period of six months cases of the following types have been treated: (1) Abscesses—superficial and deep lesions, both axillary and inguinal. (2) Infected traumatic wounds of all descriptions. (3) Infected hæmatomas. (4) Cellulitis. (5) Septic wounds due to burns of 2nd, 3rd, and 4th degree. (6) Varicose ulcers. (7) Carbuncles. (8) Infected tenosynovitis of the hand.

In all, 170 cases have been treated. Notes were kept on the progress of all of them, and in 70 of these detailed notes of the observations made were recorded. With a view to comparing the efficiency of urea with that of other solutions, the cases at first selected for treatment were those which had either behaved sluggishly with other antiseptics or had actually retrogressed. The results obtained were so favourable that we began to use urea more generally.

A patient presenting two infected hæmatomas on the outer aspect of the right leg gave us the opportunity of trying out the urea treatment side by side with a magnesium-sulphate, eusol and glycerin dressing (M.E.G.). Accordingly after the hæmatomas were incised, the larger of the two was dressed with urea and the smaller with M.E.G. After two days, whilst the larger wound showed a clean base with healthy edges, the smaller showed a sloughy base with turgid indurated edges. This difference was also observed by the patient. Both wounds were subsequently treated with urea until the patient's discharge, ten days later.

TYPICAL CASES

CASE 1.—A man aged 27 presented a varicose ulcer 1½ in. above the internal malleolus of the left leg. This ulcer measured 2½ by 1 in. He had had it for nearly 18 months without its having healed. During this time it had been treated with Elastoplast and various other substances. At the time the urea treatment was begun the ulcer was of oval irregular outline with everted swollen edges and a floor covered with a whitish foul-smelling slough. The adjacent skin was œdematous. The ulcer received the urea dressings daily for 14 days. After 2 days the foul odour had disappeared and after 4 days the base of the ulcer was covered by a mass of bright red granulations. By the 14th day the skin edges had grown in and the size of the ulcer was ¾ by ½ in. The floor was dry. The patient had a dry dressing and was discharged. The ulcer was again examined 10 days after the patient's discharge and was found to be completely healed.

CASE 2.—A male aged 47 had a septic area on the anterior and lateral aspects of the middle phalanx of the third right finger. This was drained but discharge of pus continued. The wound was opened again when it was found that the infection entered the tendon sheath. Adequate drainage was provided and the finger X rayed. There was no evidence of bony necrosis. The wound was then treated with eusol baths. After several days there was no attempt at healing. Urea treatment was started and after 3 days the slough was removed thus exposing the underlying tendon. Healthy granulations were present at this time (Fig. 1A). The urea treatment was continued, and the effects 18 days later are shown in Fig. 1B. The patient was discharged 22 days after the treatment was begun, the wound having healed completely. There was no loss of function.

CASE 3.—An Italian woman aged 44 presented herself with a 3rd degree burn of the left hand which had been neglected for 7 days. It extended from the anterior aspect of the wrist and spread across the palm laterally to the hypothenar eminence and distally to the base of the index-finger (Fig. 2A). The wound presented a large slough and emitted such a foul odour that other patients refused to be dressed in the same room and even dressers had considerable difficulty in suppressing nausea. The hand was soaked in a saturated solution of urea, then dried, and the urea crystals applied in the usual manner twice daily. She complained of some pain for the first 3 days of treatment. This was allayed by Luminal gr. ½ b.d. Within 3 days the foul odour had completely disappeared and by the 5th day the slough had completely separated, and the wound showed a fairly good granulating area which was being covered by epithelium. By the 12th day the wound was reduced to nearly half its original size (Fig. 2B). At the time of writing, 5 weeks after urea treatment was begun, there remains only a small area unhealed (Fig. 2C).

CASE 4.—A youth aged 18 had a carbuncle at the back of the neck. This was opened with cruciate incisions and the flaps well undermined until healthy tissue was reached. The wound, which was 1 in. in diameter and ¼ in. deep was packed with urea crystals and dressed daily in the usual way. During the 3 days after opening, the wound discharged and he complained of some pain. The vascularity of the base of the wound was, however, very evident. At the end of one week the discharge ceased and the wound showed a healthy granulating base and was considerably shallower and smaller. Healing continued in this fashion, the skin around the carbuncle becoming progressively less indurated and less reddened. He was given a dry dressing and discharged 23 days after the first attendance.

DISCUSSION OF RESULTS

As will be seen from the above, we have used urea in a variety of casualty department cases. Owing to the extreme diffusibility of urea when combined with a saturated solution for syringing, even the deepest wound can be effectively treated. A very definite response to urea treatment is nearly always obtained after two or three applications, consisting in the disappearance of sloughs together with any foul odour that may have been present. Replacing the slough is a highly vascular granulating surface. However sluggish the local metabolism may be this response apparently may be relied upon and is indeed often spectacular.

Septic burns, even though they cover a very wide area, under this treatment become clean and form granulations so quickly that the surrounding epithelium is able to grow in with but little delay. The same prompt response is often obtained in *varicose ulcers*. Coupled with this is a considerable decrease of œdema as the local circulatory conditions improve. The time taken for complete healing of the ulcer depends on its size and depth and on its

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chronicity. The response of *superficial abscesses* was good and requires no special comment. We gained the impression that the area of induration surrounding an abscess was in some cases eliminated and in all cases diminished by the urea. The treatment of *carbuncles* presented rather a different problem owing to the great variation in their depth, the most severe cases requiring in-patient treatment. For the carbuncles treated in the casualty department we found urea preferable to any other dressing after initial incision. Here, as with the more superficial wounds, urea could be relied upon to free the wound floor from necrotic material Where granulation tissue was more exuberant, there was sometimes bleeding during the treatment, but it was never persistent. Owing to the depth to which necrosis extends, it takes a considerable time to replace the lost tissue with granulation tissue whether urea or any other form of treatment is used.

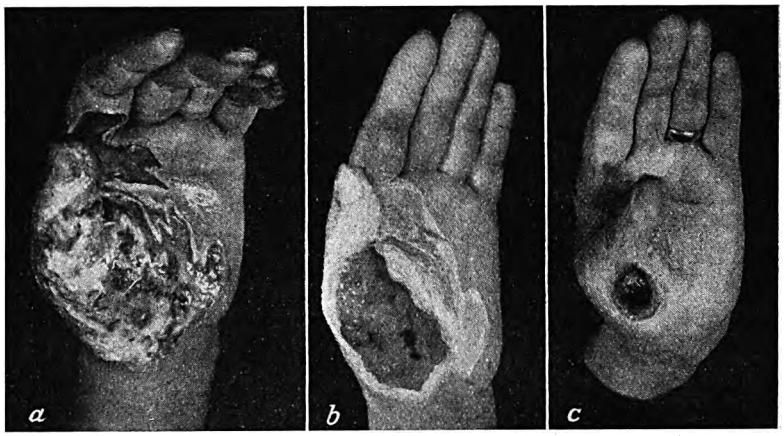

FIG. 2 (Case 3).—(A) Neglected seven-day-old burn of 3rd degree. (B) Twelve days later. (C) Five weeks after treatment began.

We have no evidence that urea directly stimulates epithelialisation. For this reason urea cannot be used as an "all purpose" casualty dressing. Many wounds will heal completely with no other treatment than the application of urea. Others though remaining healthy-looking do not heal completely. In those cases we stopped the treatment and applied one or other of the solutions in favour in the department as a stimulant to epithelialisation.

In none of the cases of our series did we observe any skin reaction which could be called a urea dermatitis, nor have we evidence of any toxic effects. We never saw a spread of sepsis under urea treatment

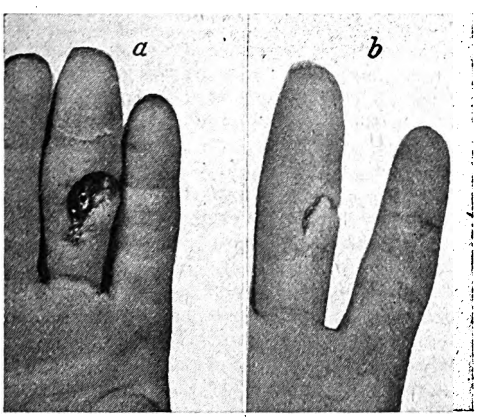

FIG. 1 (Case 2).—Septic wound with tendon-sheath infection. (A) Three days after urea treatment began and eight days after onset. (B) Eighteen days later; wound almost closed.

or any undermining of the wound edges. As a general rule no pain accompanied the treatment but in a few cases the patient experienced a burning sensation lasting half an hour after application for the first few days. It seemed to us that the pain was never greater than that in parallel cases dressed with other solutions.

It must be realised that urea does not exert an osmotic effect no matter how applied since cell membranes are freely permeable to it—i.e., any strength of aqueous urea solution will hæmolyse blood. Pain experienced as the result of urea application cannot be due to an osmotic effect.

CONCLUSION

The advantages of the urea treatment are as follows: (1) It is cheap, the crystals costing 1*s.* per lb. In the dry form it is absolutely stable. (2) It produces no dermatitis. (3) It deodorises foul-smelling wounds. (4) By dissolving necrotic material it produces a clean wound, so allowing healing to proceed. (5) Local circulatory conditions are improved and healthy granulations are produced. (6) It has no toxic effect and causes no necrosis of living material. For this reason unlike strong antiseptics it does not destroy the "leucocytic barrier" essential to the organism's defence. (7) Urea treatment has been successful where other treatments have failed. (8) We found no contra-indications to its use.

Its disadvantages are: (1) Pain is sometimes experienced on application. The cause of this is not clear. (2) Urea does not directly stimulate epithelialisation.

SUMMARY

(1) Urea has many properties that make it suitable for the treatment of infected lesions.

(2) Abscesses, carbuncles, whitlows, cellulitis, infected wounds, and burns have all been treated with success.

(3) The results of urea treatment on a series of 170 cases are discussed. They were so encouraging that the adoption of this method of treatment as a routine in the casualty department of the Royal Free Hospital is under consideration.

We wish to thank Mr. Cecil A. Joll for his helpful criticisms, and Sister North of the casualty department for her help with the treatment.

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ACUTE OSTEOMYELITIS OF THE PATELLA

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ACUTE hæmatogenous osteomyelitis is a common disease. The metaphyses of the long bones are the usual sites of election. It is uncommon for a short or flat bone to be affected. The patella is very rarely the seat of the disease.

CASE REPORT

A male aged 20 was admitted to the Royal Victoria Infirmary on Oct. 18th, 1936. On Oct. 7th he had fallen and knocked his left knee in the region of the patellar tendon. He experienced slight pain at the time, but this soon disappeared. There was no skin wound. Three days later the knee began to ache and swell. He was able to use the knee but this made the pain worse. On Oct. 13th he felt ill, redness appeared round the knee, and he had to take to his bed.

On admission.—Sallow-looking youth. Temperature 101° F. Pulse-rate 110. The left knee-joint was swollen and there was an effusion in it. There was some erythema round the sides of the joint. There was no swelling of the prepatellar bursa, and no point of tenderness round the knee. There was slight limitation of both active and passive movements of the joint. The patient experienced no pain when the heel was forcibly percussed with the knee extended. No other physical signs were elicited on complete examination. Aspiration of the joint was performed and 3 oz. of thick, yellow pus obtained. The leg was kept at rest on a Thomas splint. The temperature gradually subsided in the course of a week. Further aspiration was performed on Oct. 23rd, when 1 oz. of pus was obtained. A pure culture of the *Staphylococcus pyogenes aureus* was grown from the pus on each occasion. X ray examination of the joint on Oct. 26th showed definite rarefaction of the patella as the only abnormality.

Progress.—Weight bearing was allowed for the first time on Jan. 5th, 1937. When seen on Feb. 25th, 1937, all inflammatory signs had disappeared, but there was nearly complete ankylosis of the knee in very good position. Radiography showed the patella to be sclerosed and more defined, the lesion having healed.

CLINICAL FEATURES

Only 60 cases of acute osteomyelitis of the patella have been reported. Thirion published the first in 1829. In 1914 Chalaby was able to collect 20 reported cases and recorded one of his own. Chesky and Rocher in 1923 wrote extensively on the subject. The former reviewed the 34 cases he was able to find and added one of his own; the latter published an even more complete account, collecting 50 cases and adding his own. Neither review included the case reported by Rossenbach in 1922. The total number of cases is brought up to 60 by those reported by the following writers: Mariupolsky (1930) (2 cases), Manclark (1933), Christopher (1933), Sagel (1934), North (1934), Stella (1936), Rigaux and Milhiet (1935), and Martin and Horwitz (1935).

Ætiology.—A study of the reported cases has revealed certain facts about the disease. It has never occurred under the age of five and rarely after fifteen; 65 per cent. of the cases lie between these age limits. To account for this incidence Chesky quotes the work of Roepke (1904), who showed that up to the age of four the patella is a cartilaginous mass with practically no blood-supply. Vascularisation progresses with ossification. It is at its maximum at twelve and after this diminishes pari passu with age. The rarity of the disease is due to the patellar circulation. Roepke showed that small vessels pass from the plexus on the prepatellar ligament to the patella. The vessels are very small and soon break up into capillaries, the circulation through the bone being very sluggish. He regards the patellar circulation as a small shunt on the larger system of the limb. Infective emboli are, therefore, unlikely to be carried to this vascular side-track. In a large proportion of patients there is a history of recent trauma. The disease is five times more common in the male according to reports in which the sex is stated.

Pathology.—The usual causative organism is the *S. pyogenes aureus*. The pathological changes do not, of course, differ from those in other acutely inflamed bones. When suppuration develops it may involve the tissues round the knee, but more commonly the prepatellar bursa or the knee-joint is infected. The older the patient the more likely is the latter to occur. In the young the bony nucleus of the patella is separated from the joint by a thick layer of cartilage, which gets progressively thinner as ossification proceeds. In adults this layer is very thin and infection thus easily reaches the joint. Arthritis, however, is not a very common complication, although there is a sterile sympathetic effusion in practically every instance. In severe cases the whole or part of the patella may sequestrate.

Diagnosis.—The patient has all the general signs of an acute infection with localising signs about the knee-joint. There may be quite severe pain. The joint is held in extension unless an arthritis supervenes when the position of greatest ease of the joint (slight flexion) is assumed. In early cases radiography shows rarefaction of the patella; later a sequestrum may be seen. Diagnosis is difficult. Formerly it was made only after sequestra separated from the patella. Now radiography makes the task easier. The disease usually simulates acute arthritis of the knee or acute prepatellar bursitis. Often the latter is incised, and when a sinus refuses to heal the underlying bone disease is discovered. Our knowledge of the circulation of the patella is not very complete. It is possible, however, that the infection may in the beginning be very localised. The depth of this in the patella would then influence the course of the disease. If it should be very deep the joint might be affected early with little or no clinical evidence of patellar disease. Roepke's work showed that the infection was likely to affect the centre of the patella in children, and the periphery in adults.

Prognosis as regards life is very good. If arthritis does not supervene, complete function of the knee is regained. In many of the reported cases, in spite of this complication, a good functional result has been obtained.

Treatment.—An incision down to the patella should be made and drainage of the bone instituted. Several drill holes may be made into the patella, taking care not to open the joint, if it is not infected. When sequestra have formed, they should be removed. As long as the posterior cartilaginous part of the patella and the anterior fibro-periosteum are left, there is complete regeneration. When arthritis has supervened Johansson (1919) advises excision of the patella. This follows first principles in removing the focus of infection and provides for drainage of the joint. The recent work of Brooke (1937) seems to show patellectomy to be associated with improved rather than diminished function of the knee. If the condition could

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be diagnosed before infection had spread beyond the patella, it would be the ideal treatment, as the disease would then be eradicated and the danger of arthritis removed. In all cases the knee should be rested on a splint, and when arthritis has occurred a light extension to separate the joint surfaces would appear advisable.

DISCUSSION

The case reported here bears out several of these facts but is anomalous in other respects. Trauma appeared to play a definite part. The patient was an adult and arthritis supervened early. Clinically there was very little evidence of patellar inflammation and the skiagram was a complete surprise. It is the type of case which illustrates the possibilities theorised above. It was not considered necessary to drain the patella and the absence of sequestration appears to support the wisdom of this course. Arthritis had already supervened but this subsided with aspiration only.

My thanks are due to Mr. F. C. Pybus, under whose care the patient was, for permission to make this report, and to Mr. A. Hedley Whyte for his help in obtaining the literature.

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MEDICAL SOCIETIES

MEDICAL SOCIETY OF LONDON

AT a meeting of this society held on Monday last, Mr. J. E. H. ROBERTS, the president, took the chair and a discussion on the causes and treatment of

Flatulence

was opened by Prof. HENRY COHEN (Liverpool). A patient suffering from flatulence might, he said, complain of one or more of five symptoms: eructation, the passage of excessive flatus per rectum, distension, borborygmi, and pain or discomfort relieved by the passage of flatus or eructation. The pain was due to tension of the muscle-fibres of the alimentary tract. Flatulence might therefore be defined as gas in the stomach or bowels, giving rise to discomforts which were relieved when it was expelled. The sources of the gas were three: swallowed air; chemical (including bacteriological) change resulting in fermentation and putrefaction; and the direct excretion of gas into the tract from the blood stream. An important factor in the condition was the degree of absorption of gas, especially from the intestines.

Considerable quantities of air were swallowed normally, and radiograms of the stomach in the erect position often showed a *Magenblase* containing 40 or 50 c.cm. In general, little swallowed air passed into the gut. Gas was formed in the intestine in three principal ways. The first was the action of hydrochloric acid on carbonates in the food; the quantity of gas was small, and carbon dioxide in small amounts was not important. Secondly, carbon dioxide might be evolved from the carbonates of the alkaline pancreatic juices. The third and most important source was the fermentation and putrefaction of foodstuffs. Four factors tended to modify the absorption of gas from the intestine. These included the nature of the gas and its diffusion constant: carbon dioxide was absorbed rapidly, methane was absorbed much more slowly, and nitrogen was hardly absorbed at all. The gas tended to combine with hæmoglobin or one of the constituents of the blood plasma. The third factor in the absorption rate was the tension of certain gases in the tissues, which were already saturated with nitrogen to about the same degree as the outer air. Again, the condition of the mucous membrane was more important than had been generally realised. Changes due to toxins, inflammation, or vascular disturbances would affect the permeability of the cells, which was especially modified by the toxins of fevers and the irritative action of purgatives. The importance of fermentation had been much exaggerated, especially in the stomach, from which emptying was so rapid and where hydrochloric acid and oxygen inhibited bacterial growth. It might, however, take place if obstruction at the pyloric end caused marked stasis. Methane and hydrogen might then be belched in fairly large quantities, and this gas was inflammable. In achlorhydria bacterial growth was more rapid, even in the intestine. Under normal conditions in the small intestine the sterile chyme and its relatively rapid passage prevented much fermentation. This took place most readily in the ascending colon, the favourable factors being stagnation, fluidity of fæces, and the presence of large quantities of bacteria. Enormous volumes of gas could be evolved from relatively small quantities of carbohydrate: 100 g. of cellulose would generate 19½ litres of carbon dioxide, 7½ litres of methane, and 4 litres of hydrogen. Normally such gas was absorbed into the blood stream and secreted by the lungs. Any interference with the circulation of the bowel would therefore lead to an accumulation of gas.

Flatulence resulted only when the normal balance of activities was disturbed. If the symptom were to have significance, its underlying mechanisms in disease must be even more carefully studied and physicians must refrain from deluding themselves with such terms as flatulent dyspepsia. It had been customary to divide flatulence into gastric and intestinal. This distinction was largely artificial, and for clinical purposes it was better to classify according to the mechanisms of causation, more than one of which might be active. Prof. Cohen therefore suggested five types of flatulence: those due respectively to aerophagy, obstruction, excessive fermentation or putrefaction, disturbance of circulation, and damage to the mucosa. Aerophagy might be due to hurried meals at which fluids were taken, or to excessive salivation—as in parkinsonism and after operation. The commonest cause was perhaps, however, epigastric or substernal discomfort, the attempt to relieve which might set up a nervous habit. The discomfort might be an early manifestation of cancer of the stomach or gullet or of angina pectoris, or merely an expression of a nervous state.

Treatment should be based on very careful investigation of the cause. Less obvious causes were parœsophageal hernia, early angina pectoris, and early

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hepatic cirrhosis. Organic causes must first be eliminated and diet corrected: meals should be taken slowly and with little fluid. Salivation should be checked with belladonna and the nervous system calmed with sedatives. Carminatives should not be given to the aerophagic, as they aggravated the condition. A neurosis should be treated by explanation, reassurance, and training rather than by psychoanalysis. The causes of obstruction were largely surgical—e.g., cicatricial stenosis, malignant disease, and diverticulitis of the ascending colon—and were not easy to show by X rays. Delay could be associated with spasm or atony, and the treatment of atonic constipation should include toning up the anterior abdominal wall by massage, or mechanical support. Atonicity associated with a post-operative condition might be benefited by such drugs as Prostigmin, pituitary extract, and acetylcholine. Flatulence due to fermentation was of two kinds: carbohydrate dyspepsia, marked by large quantities of odourless flatus, and attacks of mild diarrhœa with thin, yellowish, sour-smelling stool containing intact starch granules. For some of the cases roughage was responsible. The second group were chiefly associated with intestinal infection and excessive protein putrefaction. The patient passed the characteristic alkaline stool: putrid, containing undigested meat fibres and large quantities of Gram-positive organisms. The salivary glands might excrete considerable quantities of endoxyl derivatives, which stained the dentures dark. This action was sometimes evident after large quantities of purgatives. In intestinal carbohydrate dyspepsia, cereals and vegetables should be avoided, especially those which the patient recognised as a cause of flatulence. In protein fermentation a lactovegetarian diet should be substituted for proteins. Prof. Cohen doubted whether the administration of hydrochloric acid, taka-diastase, or any digestive enzyme had any value; intestinal antiseptics had none. Symptoms might be dealt with by carminatives, absorbents such as charcoal and kaolin, and the passage of a tube into the stomach or intestine.

Mr. C. W. GORDON BRYAN said that flatulence was very common in the large group of patients, many of whom were young, anæmic, asthenic women, who had right-sided pain, usually attributed to a chronic appendix. The anxiety associated with this diagnosis and perhaps with certain methods of contraception might be a contributory cause. There was a danger, however, of unduly stressing the functional element and overlooking organic causes such as partial obstruction of the colon causing pain in the distended cæcum. A large number of so-called "visceroptoses" could be relieved by freeing the colon from bands of adhesion, and the prominence of flatulence as a symptom rather indicated that a case was suitable for this operation. Cases must be carefully selected according to the local symptoms. Often the patients who derived most benefit were those whose colons were least descended. Rarer causes were displacement of the colon above the liver, displacement of a bulky and fibrous omentum above the stomach, and obstruction of the colon by perisplenitis. Carcinoma of the colon was sometimes the cause of unexplained flatulence, and in the pelvic colon might be impossible to diagnose without a sigmoidoscope. Duodenal stasis might be partly due to the drag of the superior mesenteric vessels over the third part of the duodenum, or to fibrosis about the lymphatic glands. Short-circuiting was not satisfactory. Early diverticulitis in the stage of pre-inflammatory spasm should raise the question of operation: either of excision or of short-circuiting. True paralytic ileus was very rare and in most post-operative cases there was an element of mechanical obstruction. In operating for pelvic appendicitis Mr. Bryan always delivered the last coil of the ileum after the appendix had been removed. It usually had a considerable amount of lymph on it and was often adherent to the lateral pelvic wall, causing a severe kink. If it were cleared off, the omentum were wrapped round it, and it were left well up in the iliac fossa, many cases of obstruction could be prevented. Some patients with acute appendicitis were distended from the beginning, and it seemed better to introduce a catheter into a coil of the intestine and drain the ileum as a prophylactic measure than rely on post-operative measures alone. Gastric cases with a considerable degree of obstruction were more liable to distension after operation, and the patient had to be starved. Jejunostomy enabled the surgeon to feed the patient from the beginning and rest the stomach, and after intestinal resection he could avoid the dangerous stage of distension before the union began to work. Mr. Bryan preferred gas-and-oxygen as the least toxic anæsthetic, and advocated intraperitoneal Novocain introduced through a catheter at the site of operation. A tight binder was responsible for much discomfort and distension after operation, which could be avoided by the use of special stays. Severe post-operative paralytic ileus should be treated by rest, and stimulants should be withheld. Continuous syphonage from the duodenum through the nose or mouth was valuable, as was the repeated administration of anti-gas gangrene serum—4000 units six-hourly for a few days—and the application of heat to the abdomen. If mechanical obstruction was not too severe, a spinal anæsthetic was often effective. Most valuable of all was the administration of vast quantities of fluid subcutaneously.

Sir ARTHUR HURST said that gall-bladder inflammation was one of the commonest organic causes of flatulence. The patient had an uncomfortable feeling in his epigastrium which he misinterpreted as distension; in his futile efforts to relieve himself he swallowed air. Ordinary cooking would not break the cellulose envelope of starch in vegetables. In the small intestine the starch-splitting enzymes passed through the envelope and dissolved the starch; the resulting dextrose passed out to the small intestine and was absorbed. When, however, the food passed too rapidly through the small intestine and undigested starch reached the colon, the colonic ferments dissolved it and the dextrose was fermented by the colonic bacteria. The most important treatment was to limit unbroken starch, as in root vegetables and rice. Diastatic ferments were of little use but charcoal was helpful. In the rare condition of *aërogastrie bloquée*, swallowed gas was imprisoned by a kink at the cardia which might be due to chronic obstruction—e.g., by a healed peptic ulcer; the patient might be relieved by learning how to pass a tube. Adhesions hardly ever accounted for the comparatively slight symptoms of chronic discomfort and flatulence, and most operations for their severance brought no benefit. In a large number of cases of diverticulitis he had only twice found it necessary to operate, preferring to rely on diet and an intestinal lubricant or mucilage.

Dr. A. H. DOUTHWAITE remarked on the frequency of distension and flatulence about the third day after operation for quiescent appendix or ovarian cyst. He suggested it was largely due to the post-operative treatment and had been much worse in the days of pre-operative purgatives and starvation. Patients

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who had refused to take a fluid diet immediately after an abdominal operation had been comfortable and free from flatulence. The long starvation and lack of abdominal movement were responsible, and it was an unnecessary fetish to keep patients in bed for a clean incision in the abdominal wall. They were mostly quite fit to get up next day and even to walk about. Carminatives might act by producing a warm feeling, causing the patient to swallow more air until he brought up the whole accumulation. Dr. Douthwaite had never yet seen a patient benefit in any way from an operation for flatulence said to be due to colonic kink. No treatment was more liable to develop a confirmed hypochondriac.

Mr. V. ZACHARY COPE denied the importance of aerophagy. In the distension associated with volvulus the gas could not come from the stomach. Distension due to renal disease could not be explained by any of Prof. Cohen's five causes. He suggested that it might be a reflex phenomenon, as also might the distension associated with cholecystitis: a reflex atony of the large bowel. Suction by tube would, it was claimed, obviate the necessity for operation in a considerable proportion of cases. An American author had reported great relief, in flatulence due to obstruction, from confinement in an oxygen tent.

Dr. MAURICE SHAW declared that flatulence associated with gall-bladder disease was chiefly due to excessive postural tone of the muscular wall of the stomach, making the cavity too small for its contents. He agreed that this was probably a reflex effect. He could not agree on the virtue of charcoal.

Dr. T. JENNER HOSKIN said that in the treatment of heart disease the treatment of flatulence was almost the principal necessity. It was one of the greatest factors in acute heart failure, pulmonary œdema, cardiac asthma, and paroxysmal tachycardia. Strict diet was important: avoidance of fluids at meals and repletion. Bromide was valuable for nervous people, and an enema or high rectal tube was better than purgatives.

The PRESIDENT said that as a dresser he had been brought up to treat abdominal cases after operation with light, easily digested solid diet and a rectal tube. The patient who had trouble on the third day had usually been purged before operation and fed on slops after it. One cause of painful flatulence was spastic colon, which was almost instantly relieved by taking a lamella of atropine gr. 1/100 under the tongue. He had since always given atropine by this route.

Prof. COHEN replied.

MEDICO-LEGAL SOCIETY

AT a meeting of this society held at Manson House on Feb. 24th, with Judge W. G. EARENGEY, K.C., in the chair, a discussion on the status, scope, and legal position of

The Unqualified Practitioner

was opened by Dr. GERALD SLOT, who read a paper compiled by himself and Mr. B. A. LEVINSON. He distinguished three species of unqualified practitioners: the practitioner with real qualifications who had never been registered or whose name had been erased from the register; the person who did not possess the qualifications required by law for registration and who practised in a medically unconventional manner; and the egregious quack. Dr. Slot explained the legal distinction between registered and unregistered practitioners and the dangers of "covering." There was no legal objection to consultation between registered and unregistered practitioners. Although the law regarded all persons not on the register as in a single class, the courts would sometimes distinguish between one unregistered practitioner and another, or draw no distinction between a registered and an unregistered practitioner. Both were bound to use competent skill and care. In an action for damages the standard of skill and care was lower than in a criminal case. A jeweller, piercing a lady's ears for ear-rings, was not expected to exercise the same degree of skill or take the same precautions as a doctor. Similar standards applied to the optician. The duty of every unqualified practitioner was to refrain from treatment beyond his own limitations. One judge had remarked that the legislature had perhaps refrained from forbidding unqualified practice because, knowing the habits and customs of the English people, they were willing to leave a wide door open, particularly to those, such as rectors' wives and other "ladies bountiful," who delighted to practise the art of medicine without many injurious results. The habits and customs of the English included an aptitude to look upon medical treatment as a mystery and often to choose the mysterious to treat them. It was for their protection that restrictions were imposed.

The Medical Act, 1858, s.40, prescribed a fine up to £20 for any person who wilfully and falsely used the title physician, surgeon, doctor, or a number of others, or any title which implied that he was registered. The word "wilful" must be underlined. In Hunter *v.* Clare (1899 1 Q.B. 635) the court had decided, where a licentiate of the Society of Apothecaries had described himself as a physician, that the description was false but not wilful, inasmuch as he had reasonable grounds for thinking that he was a physician and did think so. Mr. Justice Humphreys, in Jutson *v.* Barrow,[1] said that it was not necessary to prove any intention of the accused to deceive or to represent himself as a qualified person. The wilfulness attached merely to the assumption of the description. An unqualified person could not evade the Act by adding a descriptive adjective to the word surgeon—e.g., manipulative or osteopathic. It seemed, said Dr. Slot, that if an unqualified practitioner were to carry on a medical practice entirely by means of qualified assistants without himself personally acting, and did not wilfully and falsely misdescribe himself, he would not be in breach of the Medical Acts. There was no clear decision in the legal reports of the question whether the use by an unregistered person of the name "Dr. So-and-so" was illegal. On the one hand a practitioner who announced himself in this way might be held to imply that he was legally qualified to practise. On the other hand, Murray's "Oxford Dictionary" said that the word "doctor" was, in popular use, applied to any medical practitioner. Apparently the use of this title did not come within the Acts. Another section provided that an unregistered practitioner could not charge for any medical or surgical advice or attendance, or for the performance of any operation, or for any medicine which he had both prescribed and supplied. Presumably he could not sue for the fees of a qualified assistant. If he had supplied the medicine but not prescribed it, he could probably sue; but if he had prescribed though not supplied it he had given advice. In Howarth *v.* Brearley (1887 19 Q.B. D. 302) the court held that a registered practitioner could not give a roving authority to an unqualified person to

[1] *Lancet*, 1935, 2, 1023, 1202.

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practise in his name without consulting him or taking his advice, and then sue for the services rendered by the unqualified person. If a qualified man prescribed the treatment and an unqualified man carried it out under his direction, the employer could sue. The unregistered assistant could sue his employer for his salary, but not for services rendered by him to the employer's patients or for medicines supplied to them: De La Rosa *v.* Prieto (1864 11 C.B. N.S. 578). Thus, leaving room for irrational distinctions, the law penalised the unregistered practitioner while still recognising his calling as lawful. He could not hold an appointment in any public service or friendly society, give a statutory certificate, treat any person for venereal disease, or prescribe poisons; nor could he attend a confinement except under the supervision of a registered practitioner. Subject to these restrictions he was free to practise the art of healing in the usual way, and the history of medicine showed how dangerous it would be for the law to go farther than it did.

DISCUSSION

The CHAIRMAN remarked that the registered medical practitioner was at an unfair disadvantage compared to the quack in not being able to contribute to the lay press without risk of being charged before the General Medical Council. He suggested that it ought not to be difficult to get some lead from the G.M.C. upon what forms of medical articles were permissible and what were not. It was a pity that many medical men who could usefully serve the public in this capacity were prevented from doing so. The law was not inconsistent in allowing unqualified practice and at the same time not assisting the unqualified practitioner to recover fees. The legislature had not intended in 1858 to prevent anyone from giving medical or surgical advice. It had only been concerned to prevent unqualified persons from representing themselves as qualified. It might have felt that the doctors were not the sole repositories of medical wisdom, and that any unorthodox skill which had value should not be lost. The Act would not allow a doctor to sue for the fees of an unqualified assistant. The test of whether a doctor was responsible for the acts of a masseur was whether he could control them. Perhaps if the masseur treated the patient in a doctor's house the relationship of master and servant would be constituted, but if in another house it would not. In criminal proceedings for negligence against an unqualified practitioner the jury—whatever the law might be—would probably take the view that if the patient knew the accused was unqualified, he had accepted the risk. The doing by an unskilled person of an act which in the absence of skill carried great risk of injury, might itself amount to negligence. Thus if an unqualified practitioner tried to set a broken leg, that act in itself might be negligence for which an action would lie. If, however, he did a minor service that only required common sense, that need not be in itself a negligent act. The question was one of degree.

Mr. STEPHEN LANGDON suggested that the prohibition against suing for fees went back to an age when the enforcement of penal laws was largely left to citizens themselves. Perhaps Parliament had considered it impracticable to enforce a prohibition against unqualified practitioners and had taken this method of checking them.

Mr. E. R. BOLTON asked the position of the doctor whose name appeared with his qualifications in the directory.

Mr. D. H. KITCHIN said that the General Medical Council, in considering a charge of advertising by writing in the press, asked the question whether the doctor had sought by doing so to attract patients to himself for his own gain. He had received the impression that the Council were reluctant to answer questions relating to medical conduct addressed to them by practitioners. A masseur, exercising a special skill of his own beyond the doctor's powers, might perhaps be in law an independent contractor for whose negligence the doctor was not liable to pay damages.

Dr. G. C. ANDERSON protested that a doctor had the right, as a citizen, to instruct the public through the press about matters with which he was familiar, provided he did not thereby seem to attract patients. The G.M.C. would not give a ruling on such a question but would only pronounce judgment when a case came before them. They might sometimes be persuaded to issue a warning notice. Most masseurs had a self-denying ordinance, as a condition of their diploma, that they would only work under a medical man. A chiropodist did not so limit himself, but made his own diagnosis and treated patients independently.

Dr. FRED BULLOCK, referring to a decision of Mr. Justice Horridge allowing an action by an osteopath for fees on the ground that he had not been giving medical or surgical advice or treatment, objected that the practitioner must have advised the patient to undergo the treatment upon which he had determined.

Dr. W. G. BARNARD said that a doctor's name and opinion on a medical question might become news and be lifted by a daily paper out of one of the medical journals. This was a complicated and subtle form of advertising in which the doctor probably had no say.

Mr. NEVILLE LASKI, K.C., observed that all the decisions on Bar etiquette rested on criteria of good taste and common sense which he recommended to the medical profession. A large residuum of common sense was left to the jury which investigated the conduct of an unqualified practitioner. English law was wise in its dislike of definitions. All barristers and solicitors had come across extremely sad cases in which the law had left a loophole for the commission of monstrous acts by unqualified practitioners. He was strongly in favour of barring medical practice by the unqualified. Mr. Justice Horridge had awarded fees to an osteopath not for medical treatment but for work done and services rendered.

Mr. EDWARD HINCKS pointed out that a masseur usually worked on the patient's premises and so probably not under the control of a doctor.

Mr. LEVINSON, in reply, complained that doctors were not given nearly enough scope for educating the public on matters of health.

Dr. SLOT, also in reply, could not see any objection to the publication of a doctor's name and qualifications either in Churchill's or in any other reputable directory. Presumably a doctor who wrote in the lay press was dealing with the subject in which he practised, or he would not be entitled to write about it, and in that case it would be difficult for him to avoid the implication that he was attracting patients. The G.M.C. ought to lay down definitely who should and who should not sign articles.

BIRMINGHAM HOSPITALS CENTRE.—The Austin distributor and dealer organisation for Great Britain has given £7500 to the Birmingham Hospitals Centre to mark the golden wedding of Lord Austin. The money will be used to provide two wards at the centre.

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REVIEWS AND NOTICES OF BOOKS

The Management of the Pneumonias

By JESSE G. M. BULLOWA, B.A., M.D., Clinical Professor of Medicine, New York University College of Medicine; Visiting Physician and Director, Littauer Pneumonia Research Fund, Harlem Hospital. London: Humphrey Milford, Oxford University Press. 1937. Pp. 508. 27*s.* 6*d.*

ANYONE who has had acute lobar pneumonia and has not had time to forget his feelings will probably retain as his most vivid impression the urgent desire to be left quietly alone. The experienced physician in attendance is aware of this desire and after one careful examination at his first visit in order to establish the diagnosis and determine the extent of the disease, he is likely to hand the patient over to the nurse and to interfere as little as possible with him. Those who have been brought up in this humane and conservative school will instantly cross swords with Dr. Bullowa over the statement in the early part of his book that "no patient is too ill to be examined." It would seem, moreover, that in his view no patient is ever too ill to be thoroughly investigated, almost daily, from the crown of his head to the soles of his feet.

Considered from the purely scientific viewpoint, his book is worthy of all praise. It is the outcome of studies carried on in the Littauer Pneumonia Research Laboratories at the Harlem Hospital, of which Dr. Bullowa is the director. During the six years that the work was in progress about 4000 cases of pneumonia, both adults and children, were admitted into the wards and were investigated by the author and his colleagues with a diligence which might be deemed ruthless but was certainly fruitful. No pains were spared to obtain the offending organism. This was achieved in numerous ways: by examination of the sputum, by pharyngeal swab, and even from the larynx by direct laryngoscopy. The two procedures, however, that yielded the best results were repeated blood cultures and lung suction. This last manœuvre, which sounds rather a terrifying one, has been performed by the author 2500 times; among all these cases there was only one sudden death, only four cases of non-fatal air embolism, while the incidence of empyema, in children at any rate, was no higher than that in cases not subjected to this method of investigation. From the wealth of material under study interesting facts emerge, such as the frequency of the various types of pneumococci in adults and children; the incidence of blood invasion with its influence on mortality; and the grave prognosis attending a mixed infection, particularly if both organisms are present in the blood. The general treatment and management of the pneumonia patient is considered at some length. Even those who are convinced that rest is the most important of therapeutic measures will find useful practical hints for the performance of simple procedures that will help the patient. Two chapters are devoted to oxygen therapy and oxygen tents and chambers. Dr. Bullowa condemns the artificial pneumothorax except to relieve pleural pain, but is a firm advocate of specific serum given early in bacteræmic cases and, if possible, before invasion of the blood has occurred.

The last section of the book deals with the specific pneumonias of adults and children, certain factors influencing prognosis, and closes with an account of the complications of pneumonia and their management. To each chapter is appended a full bibliography.

Practical Neuroanatomy

A Textbook and Guide for the Study of the Form and Structure of the Nervous System. By J. H. GLOBUS, B.S., M.D., Associate Professor of Neuroanatomy, New York University. London: Baillière, Tindall and Cox. 1937. Pp. 387. 27*s.*

THIS book consists of three parts of which the first is a guide to the practical study of the gross and microscopic anatomy of the central nervous system. Of the 25 sections each indicates the ground to be covered during a two-hour period of laboratory work. The figures are excellent; photomicrographs from Weigert-Pal preparations of transverse sections at all important levels are supplied, and beside each of these is a three-dimensional sketch of the cord or brain stem which is a diagrammatic key to the structures seen in the photomicrograph. This facilitates the correlation of gross anatomical features with microscopical findings and will help students who find it difficult to visualise the third dimension when looking at a section under the microscope.

The second part of the work bears the title "Résumés and discussions relative to the form, function and integration of the several divisions of the nervous system." It is designed to serve as a handy source of reference for those working through the practical course previously outlined, and will be useful also for purposes of revision. Fourteen case-histories are included, and the relation of clinical findings to anatomical facts is well brought out. The third part of the book consists of a series of outline figures of dissections and semi-completed drawings of microscopic preparations intended to be filled in and labelled by students during laboratory periods. These pages are perforated so that each may be removed temporarily while the labelling is done. The educational value of this section of the work is doubtful. Semi-completed drawings tend in our experience to irritate able students and to be ineffective in stimulating the observation of the less able.

Introduction to Physical Anthropology

Second edition. By E. P. STIBBE, F.R.C.S., Reader in Anatomy, University of London, King's College. London: Edward Arnold and Co. 1938. Pp. 230. 10*s.* 6*d.*

THE exaltation of certain physical types and the persecution of others, the deliberate preaching of racial prejudice and the enforcement of biased immigration laws have all been excused, justified, or eagerly vindicated by anthropologists. Hence it is necessary that those who speak in the name of anthropology should be men of wide education and culture, sincere in their scientific methods, and courageous without being dogmatic in their conclusions. The author of this book is a professional anatomist, has done distinguished work in tropical medicine, and has built up a reputation for himself in the field of experimental neurosurgery. He has moreover done much to promote the cultural and recreational activities of the medical students of the University of London. He has brought to this subject

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what it most needs—a broad outlook coupled with severity of method.

Mr. Stibbe begins with a general biological introduction and then proceeds to make the student acquainted with the anatomy of the primates, their neurological make-up and their behaviour. This leads on logically to an account of man's evolution based especially upon the anatomy of both man and the great apes. The second part of the book supplies a general exposition of palæontology and, after a description of the various fossil primates, proceeds to the study of fossil man with a discussion on climates, ice ages, physical types, flint implements, and the like. The third part is concerned with the existing varieties of mankind and their physical assessment; and finally the reader is given detailed instruction in the technique of studying actual anthropological material living or dead, recent or fossil. The appendix by Dr. W. A. Sinart includes a brief sketch of the mathematical methods by which large masses of anthropological data can be studied.

The administrator, the colonial official, the archæologist, the classical scholar on a "dig," the biologist, the student of evolution and genetics, the biometrician, the investigator of blood groups, all these and others may or must become students of, or give some measure of study to, physical anthropology. This easy, even gentle, introduction should encourage both amateur and professional readers to explore further one or more of the aspects of the study of man presented to him with such grace.

Ergebnisse und Fortschritte der Antimontherapie

By Prof. Dr. phil. nat. HANS SCHMIDT and Dr. med. F. M. PETER. Leipzig: Georg Thieme. 1937. Pp. 218. RM.15.50.

THIS book will appeal to two classes of readers, those practising tropical medicine and those interested in chemotherapy. The epoch of antimony therapy, which began about thirty years ago, has seen the discovery of the action of antimony in various tropical infections, and has provided a field for chemotherapeutic research in which, starting from tartar emetic, many less toxic and more convenient synthetic compounds have been developed. In 1922 one of the present authors, who has taken a leading part in the production of these drugs, published a book dealing with the developments of the first half of this period; principally, that is, with the therapeutic trials of tartar emetic. The last 15 years have witnessed the development of the modern pentavalent preparations, such as neostibosan and its precursors, stibenyl and stibosan, as well as of the newer trivalent compounds, especially fouadin and its prototype antimosan. The present book reviews this later period.

The opening chapter summarises the history of antimony therapy and briefly discusses the various types of preparation, their properties and mode of action and administration. This is followed by two chapters on their clinical application in human and veterinary infections. Then come chapters dealing with the synthesis, with the therapeutic laboratory trials, and with the pharmacological properties, as revealed both by experimental work and practical experience, of the various compounds. The final chapter records the newest preparations, including remarkable combinations of arsenic and antimony. The authors have sifted the voluminous literature and the bulk of the chapters consists of précis of the various papers in chronological order. This unusual form was chosen in order to give the reader a clear picture of progress and to reveal the sometimes divergent views; it facilitates reference to any article in which the reader may find himself specially interested. The various sections begin with brief sketches of the older therapy and end with short critical summaries.

A Monograph on Veins

By KENNETH J. FRANKLIN, D.M., M.R.C.P., Tutor and Lecturer in Physiology, Oriel College; Assistant Director, Nuffield Institute for Medical Research, Oxford. London: Baillière, Tindall and Cox. 1937. Pp. 410. 27s.

THIS book is principally a symposium of embryological, anatomical, and physiological literature on the venous system. It will be valued particularly by research workers and those interested in the history of medicine, for we know of no other work in English in which the venous system is described with such attention to detail. The field covered in the survey is wide, anatomical and developmental factors being ingeniously related to function. The experimental side is fully considered in its pharmacological as well as in the physical aspects, and in relation to certain special parts of the venous system as well as to the system as a whole. Dr. Franklin's own contributions to our knowledge of the mechanics of the venous circulation are rather obscured by the number of his references to the work of other investigators.

To clinicians the book has little to offer, except of course in so far as a knowledge of the normal venous circulation enables us to deal with abnormalities due to disease. But in a monograph of this size it is disappointing to find so little about the factors predisposing to phlebitis and the changes which occur even in healthy vessels as age advances. Thrombosis is scarcely considered, and nothing is said about the relative frequency of thrombosis in the veins of the arms and legs, and the factors which influence the incidence of this complication of intravenous infusions. The significance of the lymphatics which accompany veins and their involvement in certain cases of phlebitis is not discussed. This criticism is not intended to belittle the book, but merely to indicate its scope; for its object has been to set forth physiological principles, and in this it has been brilliantly successful.

The Therapeutic Problem in Bowel Obstructions

By OWEN H. WANGENSTEEN, B.A., M.D., Ph.D., Professor of Surgery, University of Minnesota; and Surgeon in Chief of the Minnesota Hospital. London: Baillière, Tindall and Cox. 1937. Pp. 360. 27s.

THIS essay, for which the Samual D. Gross prize was awarded to the author in 1935, is concerned with the therapeutic problem of intestinal obstruction. He surveys the literature and presents the results of experiments, particularly dealing with the effect of distension on the anatomy and physiology of the intestinal wall. The upshot of it all is to emphasise the importance of the vitality of the wall, and to show that toxic absorption is kept in abeyance so long as the mucosa remains alive. This section of the book is of much interest. The rest describes the clinical features of obstruction, its different forms and its treatment. It is a valuable contribution to surgical literature.

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THE LANCET

LONDON: SATURDAY, MARCH 5, 1938

MATERNITY HOME ADMINISTRATION

RECENT cases in the coroner's court and elsewhere must be causing the public to wonder whether the patient who enters a maternity home for her confinement will get what she has a right to expect. An inevitable tendency to generalise may well create the impression that something is radically wrong with the system. While we have no particular instance in mind, we feel that the impression is not entirely ill-founded. Doctors seem to ignore the statutory regulations which require the notification of puerperal fever. Where several doctors are attending their patients in the same home, vital information about the condition of other patients seems not to be conveyed. Matrons seem to be so utterly dominated by the tradition of reliance on the medical practitioner as to be incapable of independent thought or action. The Ministry of Transport gives us a Highway Code to educate us in, and to insist upon, a high uniform standard of care upon the roads. The Ministry of Health ought to give us a Maternity Hospital Code which would bring to the uppermost level the widely varying standards of maternity practice. In one instance after another the expert witnesses have pointed out that the accepted modern precautions such as the use of masks, gloves, and sterilised clothing have been neglected or have been introduced only after some unfortunate fatality. Whose fault is it that, in these matters, something less than the best is tolerated? Is it ignorance or want of interest?

The hon. secretary to the British Hospitals Association, a body always alert to improve hospital conditions, has sent us some pertinent comments upon the situation. He points out that no practical steps appear to have been taken to avoid what BURKE called "dull uniformity in mischief and the unpitied calamity of being repeatedly caught in the same snare." He has taken the opinion of a barrister who has special knowledge of hospital matters. The barrister notes that there seems no person with medical knowledge in general charge of the maternity home whose duty it is to know the general condition of all the patients, to notify cases when necessary, to take proper precautions as to disinfection, to keep all the medical practitioners informed in emergency of the condition of each other's patients in the home, and so on. It seems to him that the remedy is that the lay governing committee in any home should appoint a superintendent—either a doctor or a matron—with the necessary medical knowledge and experience in maternity cases to know what steps ought to be taken in emergency and with the authority to enforce the doing of what is required. The superintendent, he continues, should be made to understand that he or she is solely responsible for seeing that the home is in a fit state for the reception of new cases, for closing the home when necessary, and for notifying to all doctors having patients under the same roof any suspicious symptoms in any patient.

The barrister confesses that he makes his suggestions without intimate acquaintance with the problems and anxieties of actual medical administration. A doctor may rejoin that, unless he is assured of an indemnity of the most solid financial kind, he will not volunteer for the position of superintendent wherein he will be the target of every action for damages for alleged negligence. Difficult as her post may be, it is the matron who has to bear the main responsibility. In the Ashby-de-la-Zouch case, it will be remembered, Mr. Justice SINGLETON explained that the matron could not absolve either herself or the hospital authorities by saying that she relied upon the doctor. She is, said the judge, the head of the hospital and is in charge on the administrative side. It is she who, subject to the hospital rules, makes the arrangements to receive the patients. She decides the bed or ward into which the patient shall go. She is held to know the conditions of the hospital and, in particular, of the maternity ward. It is her duty not to subject patients to the risk of infection. If she receives a patient into a ward where there is infection, she invites the patient into a dangerous place. It is, as Lord WRIGHT observed in Lindsey County Council *v.* Marshall, as bad as if the patient were invited to enter a hospital where the drains were defective and there was a risk of typhoid.

These dicta suggest that, without any change in the administrative structure, the matron is already charged with the very kind of responsibility which the proposed appointment of a special superintendent is designed to fix and define. Whether this be so or not, there must be many maternity homes which need to overhaul their organisation and their methods. The public must have been disquieted by Mr. Justice SINGLETON'S statement that, in the case already referred to, the mother would have been far safer in her own home.

THE ÆTIOLOGY OF APPENDICITIS

IT is five years since the pathology of appendicitis was considered at length in these columns,[1] and in conformity with the practices of modern governments it seems appropriate to review the advances that have been made within that period.

Acute appendicitis began to be common between 1895 and 1905; it serves no useful purpose here to discuss whether its incidence rose about that time or whether it merely became recognised as a clinical entity. On the assumption that it became commoner, changes in national habits have been sought to explain the difference; changes in diet (particularly the reduction of cellulose foods), the substitution of steel for stone millstones, and altered sanitary conditions have all been blamed. Consti-

[1] *Lancet*, 1933, 1, 311.

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pation has naturally been regarded with suspicion, but there is no statistical evidence to incriminate it; on the other hand it is agreed that acute appendicitis arises more often in organs that are bent or fixed than in those that are freely mobile. As to the importance of fæcoliths there is disagreement: ASCHOFF [2] regards their coexistence with appendicitis as purely fortuitous, but BOWEN,[3] SPENCER,[4] and many others hold that there is a definite ætiological relationship. With regard to the infective agent there are again two schools of thought—the hæmatogenous and enterogenous. ROSENOW put forward the view that acute appendicitis was the result of the selective affinity of certain throat streptococci for the appendix, whereas ASCHOFF,[2] by extensive studies of normal and inflamed human appendices, showed that the appendix has a special bacterial flora, the members of which are responsible for the attack; he suggested that in acute appendicitis there is an enhanced virulence of this normal flora brought about not by obstruction of the lumen but probably by stagnation of the fæces within it. FISCHER and KAISERLING [5] have attempted to explain ASCHOFF'S findings by the hypothesis that appendicitis is an allergic reaction and that a "specific sensibilisation of the lymphatic system" produces the altered relationship between the appendicular mucosa and its normal bacterial flora. HEINEMANN,[6] however, has shown that although an allergic appendicitis may be produced in rabbits, its lesions are distinct from those found in human appendicitis (the necrosis beginning in the lymphoid follicles rather than the mucous membrane); she believes that the intense inflammatory reaction obtained in FISCHER and KAISERLING'S experiments was chiefly due to the toluol used as a preservative and was not purely hyperergic.

The most significant experimental work of recent years is that of WELLS.[7] Working with rabbits he has shown that the injection of bacteria, damage to the mucous membrane, partial cutting-off of the blood-supply, or obstruction of the lumen by a foreign body have no effect on the appendix. If both the appendicular artery and the vessels in the meso-appendix are ligated the appendix becomes gangrenous; if in addition the lumen is occluded it merely shrinks. If, on the other hand, the lumen is occluded by a ligature without tying the vessels a mucocele develops. Finally if the lumen is occluded by ligature or by a foreign body, and the mucous membrane is damaged either by crushing the appendix or by inserting a needle and scratching the mucosa, fatal acute appendicitis always follows. From these experiments it is clear that in the rabbit acute appendicitis occurs whenever there is obstruction and a break in the mucosal barrier, the infecting organisms being those normally present in the organ; if the mucosa is intact obstruction merely produces a mucocele. These findings are in keeping with the hypotheses of BOWEN and SPENCER that in man acute appendicitis is an enterogenous infection associated with the mucosal trauma produced by a fæcolith. What the precipitating cause of an attack may be—whether purely mechanical or associated with local vascular change leading to œdema and consequent complete obstruction—remains obscure. Similarly the factors involved in the formation of fæcoliths are no clearer than they were when S. G. SHATTOCK postulated a "neuromuscular fault." The fæcolith is simply a concretion of fæcal material analogous to a scybalum and is not formed around a foreign body; whether the appendicular stasis which permits its formation is due to lack of coördination in appendicular peristalsis or in the secretion of mucus and absorption of water in the appendix is uncertain. In the normal animal, as WELLS [7] and HARRIS, COX, and BLALOCK [8] have shown, it is difficult to occlude the lumen by foreign bodies because the musculature forces them into the cæcum.

WANGENSTEEN [9] and his co-workers have investigated the functions of the human organ in appendicostomy cases. Lead shot were inserted and as a rule were rapidly passed into the cæcum, occasionally causing colic; organisms from suppurative appendices had no effect when introduced into the stoma. They also observed that although there is no true sphincter at the appendiculo-cæcal junction, there is nevertheless a definite resistance to fluid outflow, the basal pressure in the appendix being 15–25 cm. of water, whereas it is only 3–4 cm. in the cæcum. They were able to collect about 1–2 c.cm. of secretion from the human appendix in a day and they state that of all the animals investigated the only one that showed secretion was the rabbit, in which it could be enhanced by the administration of croton oil by mouth or of hypertonic saline intravenously—to such an extent that a ligated appendix ruptured. However, this animal experimental work is not perhaps of such significance as appears at first sight, for in every case they inserted a cannula into the tip of the appendix, and they do not distinguish clearly between a mucocele and an acutely inflamed appendix, whereas WELLS'S criterion of acute appendicitis was that it should produce a generalised peritonitis with death of the animal. It is also regrettable that WANGENSTEEN misquotes from WELLS'S paper, misinterpreting his very clear report.

Reviewing these various investigations it seems probable that in most cases of acute appendicitis the infecting organisms are those normally present in the appendix; that obstruction by fæcoliths is a predisposing cause; and that the precipitating factor is a complete obstruction of the lumen with injury of the mucosa. The ætiology of the fæcolith and the factors inducing this obstruction remain undiscovered.

[2] Aschoff, L., Appendicitis, its Ætiology and Pathology, London, 1932.
[3] Bowen, W. H., Appendicitis: A Clinical Study, London, 1937.
[4] Spencer, A. M., *Brit. med. J.* Jan. 29th, 1938, p. 227.
[5] Fischer, E., and Kaiserling, H., *Virchows Arch.* 1936, 296, 146.
[6] Heinemann, K., *Beitr. path. Anat.* 1937, 100, 62.
[7] Wells, A. Q., *Brit. J. Surg.* 1937, 26, 766.
[8] Harris, P. N., Cox, B., and Blalock, A., *Surg. Gynec. Obstet.* 1930, 50, 572.
[9] Wangensteen, O. H., Buirge, R. E., Dennis, C., and Ritchie, W. P., *Ann. Surg.* 1937, 106, 910.

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EXPLOSIONS IN THE OPERATING THEATRE

THE studies by Mr. E. H. RAYNER, Sc.D., of the National Physical Laboratory, on the production of static electricity and on its ability to originate explosion have already been practically applied in many operating theatres where small chains trailing on the floor prevent risk of explosion from static electricity generated on the table or apparatus from which the chains depend.[1] This simple precaution is of course not applicable if the floor consists of insulating material such as rubber or cork carpet. On Feb. 24th Dr. RAYNER in a paper read before the Institute of Electrical Engineers elaborated his view[2] that the danger of explosion from this cause in association with anæsthetics is extremely small in a humid atmosphere —at least 65 per cent. of saturation. This fact, or rather its converse, must be kept in mind when air conditioning is applied to operating theatres, for then the preventive humidity is often abolished. Moreover the care taken to prevent steam from the sterilising room entering the theatre removes a chief source of moisture and gives rise to the paradox mentioned by Dr. C. F. HADFIELD in the discussion on Dr. RAYNER'S paper that in America the theatre atmosphere is being moistened to avoid explosion, while here we are tending more and more to deprive the atmosphere of what humidity it might possess.

In this country the more frequent cause of ignition or explosion of anæsthetic vapours is not a static spark but faulty electric apparatus. At the same meeting Prof. W. M. THORNTON spoke of various types of electrical ignition. Of these, ignition by hot wires, as in a cautery, and by small lamps overrun and therefore unduly heated, appears to offer the greatest danger. In any inflammable gaseous mixture there are of course clearly defined limits of the proportions of the gas to air or oxygen that are explosive as well as of the critical intensities of the source of ignition whatever that may be. The probability of ignition depends in fact not only on the intensity of the spark but on the rapidity of chemical combination in the mixture, which itself depends on the proportion of inflammable gas and whether the diluent is oxygen or air. The limits of inflammability are much wider when oxygen is used. Prof. THORNTON after many experiments found the lower limit for ether-air mixtures was 3·14 per cent. and the upper limit 9·5. It is plain that with open ether administration the anæsthetist often handles a mask conveying a mixture within those limits of inflammability, and the rigorous exclusion of such a method from any operation where a cautery or other form of heat is used is thoroughly justified on scientific as well as clinical grounds. With ether-oxygen mixtures the observed limits were 2·98 and 45·5 per cent.; outside these limits explosions do not occur. In practice it is usual to blow a mixture of about 20 parts ether vapour and 80 parts oxygen towards the patient's mouth, and there is then some admixture with air. One practical result of Prof. THORNTON'S work is the finding that the small inherent inductances in alternating-current circuits may make them ignite ether mixtures more readily than do non-inductive direct-current circuits. Dr. HADFIELD emphasised the extent to which explosive gases had in modern practice ousted the non-inflammable chloroform, and the unfortunate fact that in some operations where cyclopropane, a highly inflammable gas, was most desirable its use was prohibited because the operations had to be carried out with the aid of diathermy. Dr. LANGTON HEWER pointed to the diminution of explosive risks when the closed-circuit CO_2-absorption method of giving anæsthetics is used.

To enlist the interest of such a body as the Institution of Electrical Engineers in the practical problems of ensuring safety for the patient is a wise step. It is easy, however, to exclude an inflammable anæsthetic so as to eliminate risk of explosion, and at the same time to expose the patient to a greater one by ruling out the particular drug that would otherwise be chosen. That is the sort of caution which would defeat its object and it is up to the electrical engineer to see that the anæsthetist is not called upon to exercise it.

[1] See *Lancet*, 1937, 2, 460.
[2] *Ibid*, 1936, 2, 1408.

APATHY AND FEAR

THERE is little need for us to draw attention to the article on p. 589. Dr. Hancock, being in charge of a mental hospital in a somewhat exposed position between London and the coast, is preparing his staff and his patients against possible air-raids, and gives us the benefit of his experience and ingenuity. His paper will be valuable to other administrators with similar tasks in front of them and they will have to consider in what respects they should follow his example. The first question that arises is how far it is necessary and desirable to appeal to fear, either in the population as a whole or (especially perhaps) in the insane. Fear of foreigners helps to unify small groups as well as nations, and possibly collaboration in air-raid exercises will bring some mental patients into better relation with their fellows inside the walls and with their compatriots outside. The use of devils to cast out other devils is an increasingly popular politicotherapeutic procedure. On the other hand one cannot help thinking that if apathy about the air menace is permissible anywhere it might be allowed to continue as long as possible among those who are unfortunate enough to be sent into an asylum—we use this outmoded word advisedly. As for the larger problem, much of the present tension in Europe is due to success in making people afraid of air attack; the Germans, Poles, French, Russians, Italians, and inhabitants of most other European countries have one after another grown terrified—and have increased their air forces, and apparent aggressiveness, accordingly. It is of course impossible to organise national defence at all without increasing the separateness of the nations—a separateness already pathological. But in taking precautions it should always be borne in mind that we must do as little as possible to spread fear and hatred.

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ANNOTATIONS

MEDICAL EXAMINATION FOR MOTORISTS

ON the basis that a considerable proportion of road accidents are caused by physical or psychological unfitness, a correspondent [1] has lately advocated the physical examination of all applicants for a licence, and the psychological examination of every licence-holder who has had more than a certain ration of accidents during the currency of his licence. Prof. Parisot and Dr. Richard,[2] as our Paris correspondent reports on another page, have been putting a similar suggestion before the French Academy of Medicine. It appears that members of the medical profession in France have repeatedly urged that driving licences should be issued only to persons who have passed an adequate medical examination; but the legislature declines to be interested. The evidence in favour of the proposal includes a striking decrease in the accidents of a large corporation which instituted a medical test for its drivers ten years ago, and a rise during a year in which the rule was relaxed. Parisot and Richard give a list of countries, including Italy, Germany, Denmark, and Holland, which have adopted the rule. The kind of case on which they lay stress is chiefly the cardiovascular one; the driver has a high blood pressure and arterio-sclerosis and may be suddenly overtaken by unconsciousness or paralysis.

In this country there is little sign of a popular movement towards medical examination for licence-holders, and at present the law contents itself with requiring a declaration that the applicant does not suffer from any of a number of named conditions. These include epilepsy, attacks of fainting and giddiness, and most of the physical and mental handicaps which are most dangerous to a driver. An applicant for the renewal of a licence has to declare that his condition has not changed. Besides the ordinary driving licence, the driver of a public service vehicle —e.g., a bus or motor coach—has to obtain a licence from the traffic commissioners of his area (in London, from the police), and before this can be issued he must produce a medical certificate stating that he is free from the handicaps specified in the form of certificate. When he applies, at the end of three years, for the renewal of this licence, he must make a declaration that his physical condition has undergone no harmful change (presumably, if his mental condition has deteriorated, he need not say so !). There do not seem to be any statistics showing the proportion of road accidents due to ill health in drivers, and there is no positive evidence that it is considerable. The question of legal liability might perhaps arise if a driver knowingly drove under a handicap and caused injury because of it. The Court of Appeal recently heard a case [3] in which a woman claimed damages against the employers of a lorry-driver who died suddenly at the wheel from fatty degeneration of the heart, so that the lorry mounted the pavement and pinned her against a wall. She claimed that the firm had been negligent in allowing a driver in that condition to drive one of their vehicles, and that they should have had him medically examined. The medical evidence, however, showed that this condition may develop without producing any symptoms until some slight exertion causes death. The man had in fact appeared perfectly well and the employers had never had any reason to suspect that he had a bad heart. The probability was that, even if he had been medically examined, the examination would not have indicated that he was likely to collapse that day. An ingenious attempt to couple a latent defect in the man to the vehicle, so as to make it a "Rylands *v.* Fletcher object" [4] for which the employers would be absolutely liable without proof of negligence, also failed, and the accident was adjudged to be an act of God. We recollect that in an action brought not long ago against a driver who had fainted at the wheel, he was held not to have been negligent and therefore not responsible for the resulting injury. His illness was, of course, not due to any of the conditions which he was bound to declare in his form of application for a driving licence. Another driver whose car killed a number of persons because he had an epileptic fit was found guilty of manslaughter, because he knew that he was likely to be attacked at the wheel and was therefore culpably negligent in driving at all.

[1] Turner, H. M. S., *Lancet*, 1937, 2, 881.
[2] Parisot, P., and Richard, G., *Bull. Acad. Méd., Paris*, 1938, 119, 122.
[3] Ryan *v.* Youngs, 1938, 1 (All England Rep. 522).

IMMEDIATE EFFECTS OF INTRAVENOUS INFUSION

MUCH experimental work has been done to prove the value of intravenous infusions. The demonstration of changes in the blood volume as a result of the infusion has been the chief difficulty. Gilligan, Altschule, and Volk [5] have studied the effects of isotonic and slightly hypertonic solutions given intravenously to human subjects, some of whom had been operated on but none of whom showed signs of shock. After finding the normal initial blood volume by calculation or a dye method they estimated the blood volume changes in three different ways:

(1) Plasma volume changes were found from alterations in the plasma protein percentage, and the total blood volume change was found from this and the hæmatocrit reading. It is assumed that the total plasma protein in the circulation remains constant.

(2) Plasma-volume changes were found by the "Evans blue" dye method, the total blood volume being deduced as before.

(3) Total volume changes were calculated from hæmatocrit readings, assuming that the red cells in the circulation remained constant.

Quantities of 450–1000 c.cm. were given at different rates. In all cases the hæmatocrit reading and plasma-protein percentage were lower after the infusion and the blood volume was raised. It is to be noted that the blood volume was still considerably raised half an hour after injection, and "appreciable" though small elevations were found "up to about two hours after the end of the injection." High rates of injection were more effective than low, but increases of blood volume above 20 per cent. were difficult to maintain. An incidental finding of great interest was the absolute reduction of red cells noted while the blood volume was raised. It is clear that calculations based on the constancy of the plasma protein in circulation are accurate if done over a very short period on conditions that are not likely to interfere with the plasma protein. And it is equally clear that fallacies are introduced in attempting to calculate the blood volume from the red-cell volume, when, as happened in this work, there was a decrease of red cells during a period of raised blood volume. Over a

[4] Rylands *v.* Fletcher, 1868, L.R. 3 HL. 330.
[5] Gilligan, D. R., Altschule, M. D., and Volk, M. C., *J. clin. Invest.* January, 1938, p. 7.

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longer period, when changes in the total protein of the plasma are likely to take place, the assumption that the red cells remain constant is more reasonable. The dye method is reliable in this series since none of the patients was shocked and there was therefore no tendency for the dye to leave the circulation with the plasma. It is probable that, in the study of shock, the constant red-cell method will yield more reliable results than the other two. The ideal for this purpose should be a combination of the carbon monoxide and the plasma dye method.

From the point of view of treatment the present work is not very helpful, for only a temporary dilution of the blood by the intravenous fluid has been demonstrated. A comparison with fluids administered by the mouth or rectum would have been of greater interest.

MALIGNANT TUMOURS OF THE NOSE

UP to the beginning of the present century it was held that malignant tumours derived from connective tissue were more frequently met with in the nose and accessory sinuses than were those of epithelial origin; this view is now known to be erroneous and probably arose from the difficulty of distinguishing granulomata from neoplasms. Squamous-cell carcinomata are the most common, and this is probably to be explained by metaplasia, for the lining of these cavities chiefly consists of columnar ciliated epithelium. Because patients usually seek advice when the disease is far advanced, it is often difficult or impossible to decide the region in which the tumour has its origin, but the majority begin in the antrum. The prognosis, though bad, is better than it was a few decades ago, due to earlier recognition, to improved operative technique, and to the effects of modern irradiation therapy. In a thesis [1] written for the doctorate of medicine in the University of Groningen, of which a summary in English is appended, H. C. Wykerd discusses the pathology, symptoms, diagnosis, and treatment of these tumours. He holds that the best results are obtained by electro-surgery followed by irradiation. Great importance is attached to radiography, not merely for diagnosis, but to determine the exact locality of a growth, its operability, and the best method of its removal. The histories are detailed of 35 cases admitted to the University Hospital of Groningen during the last 13 years; of these 25 were carcinoma and 10 sarcoma. The site of origin is said to be the antrum in 22, the nasal cavity proper in 6, the frontal sinus in 5, and the sphenoidal sinus and nasal septum in 1 case each; but these figures must be accepted with reserve in view of the difficulty, mentioned above, of determining the site of origin in advanced cases. An interesting case is recorded where carcinoma in the left antrum developed a year after the removal of a carcinoma of the right antrum; there was no local recurrence after the first operation, the nasal septum was intact, and there was no visible connexion between the two sites. Metastases occurred in 27 per cent. of these 35 cases. Treatment is dismissed rather too briefly; of the 35 cases, 5 had no treatment, 14 received irradiation only, and 16 were submitted to operation with or without post-operative irradiation. One patient has not been traced, seven are alive and well, one after 3 months, one after 18 months, and the remaining five for a period of 3½ to 11 years. Of the twenty-two who have died, one survived for 4 years and 10 months, one for 3 years and 6 months, and two for 2 years, one of whom died from cerebral hæmorrhage; eleven died within 1 year, and seven within 2 years. Tables are given which show the results obtained elsewhere by various authorities, but the methods of treatment employed are not described in detail.

[1] Maligne Tumoren van de Neus en Neusbijholten. By Hermanus Claassens Wykerd. Groningen: J. B. Wolters. 1937. Pp. 148.

COMPLEMENT-FIXATION TEST FOR GONORRHŒA

THE gonococcal complement-fixation test can scarcely be regarded as new, for it was first introduced in 1906; but its place in diagnosis is not yet clear and those most familiar with its application in our large venereal diseases centres believe that its value is generally underestimated. Many pathologists have obtained conflicting and unsatisfactory results that have led them to criticise or abandon the test; but many of these failures have perhaps been due to failure to master a difficult technique without special instruction in it. At a meeting of the Medical Society for the Study of Venereal Diseases on Feb. 25th Dr. Orpwood Price and Dr. T. E. Osmond referred to the "bad performance of a good technique" and the existence of a number of unreliable techniques. It seems that the would-be expert must not regard this test as a side issue, but must be prepared for constant practice with a large number of sera, using a good technique and a reliable antigen. The results obtained must be rigorously checked against the clinical findings.

The test is, of course, a measure not of infection but of antibody-formation in the blood-serum, and the results depend therefore on the quantity of toxins absorbed and on the response of the tissues to these toxins. In gonorrhœa the nature and extent of infection and of immunity response may vary very widely, and there will be corresponding variations in serological reactions in different patients and in different stages of the disease. As Dr. Price put it, "this test is no more than an accessory method of diagnosis to be interpreted by the clinician in the light of the clinical findings." A negative result does not exclude the presence of infection either in preliminary diagnosis or in investigations as to cure, but a positive one may be relied on in a very large proportion of cases, provided that gonococcal vaccine has not been used in treatment. "False positive" reactions—that is to say, positive results in patients without clinical or bacteriological signs of infection—are rare; in Dr. Osmond's experience their incidence is only 0·3–0·6 per cent. Syphilis does not give positive tests but severe infections with *Micrococcus catarrhalis* may very occasionally do so. On one point only was there an important difference of opinion between these authorities—on the interpretation of a "fixed positive" test in the apparently cured patient. Dr. Price believes that the immunity never persists after cure and that a fixed positive serum test therefore indicates a latent undiscovered focus of infection. On the other hand, Dr. Osmond knows of patients who have continued to give such a reaction for years without showing clinical signs of infection; some of them have married and produced healthy children and there has been nothing to suggest transference of infection to the partners in marriage. With this latter view Colonel L. W. Harrison agreed. He has kept numbers of such patients under observation for years and believes that they are not necessarily carriers of gonococci, though absence of infection should not be assumed without the most careful possible testing and observation. Other speakers concurred in this view. It is

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clear, therefore, that on this important question there is still difference of opinion, but the weight of experience seems to be on Dr. Osmond's side. To the clinician who must from time to time make this difficult decision as to whether a patient has got rid of every gonococcus these expressions of opinion will bring comfort; but they will not free him from his duty to impose the most exacting conditions of testing and observation before rejecting a persistently positive complement-fixation test as evidence of residual infection.

MEDICAL STUDENTS COMMITTEE

MOST continental countries have organised bodies representative of medical student opinion, but there has hitherto been no such organisation here. An attempt is now being made, under the auspices of the National Union of Students, to remedy this state of affairs. At the annual conference of the Union last April it was proposed that a national medical committee should be set up, and in July delegates from fourteen medical societies met for the purpose. The committee then elected meets each term and aims at furthering the welfare of medical students in every way possible. It has gained much support from the provinces but less, so far, from the London medical schools. The service of the N.U.S. travel department has now been placed at its disposal, and it is in a position to organise medical tours to any foreign clinic at reasonable cost. This Easter (April 16th to 28th) there is to be a tour to Sweden with visits to clinics at Gothenburg, Stockholm, and Uppsala. The committee will also introduce suitable guides to students visiting teaching centres at home or abroad. A library of cinema films on medical subjects is being formed. From July 18th to 21st there is to be a second London meeting of delegates (and others who care to attend) at which there will be a discussion on the Training of the Doctor. The address of the N.U.S. Medical Students' Committee is 3, Endsleigh-street, London, W.C.1.

THE QUESTIONABLE RAY

UNDER the title "The Campaign against Rheumatism" the *National Insurance Gazette* for Jan. 27th publishes an interview with Mr. Frank Bailey, general secretary of the N.U.R. Approved Society, and this interview has been widely quoted. Our readers will hardly turn to Mr. Bailey for information on the success attending medical efforts in the treatment of rheumatism, but it is important that they should take note of the message that is being handed on to the rheumatic working man. Briefly the treatment advocated consists in applying a "Q-ray compress" to the affected parts, and Mr. Bailey stated for the reassurance of his hearers that "our bold innovation was only made after personal experience and the closest investigation, when it was found that the Q-ray compress was being used extensively in most of the leading hospitals of this country, and also in the homes of the wealthy classes, with marked success." Mr. Bailey's society, it appears, secured permission from the Ministry of Health to offer Q-ray treatment as an additional benefit under National Health Insurance, and arrangements have been made whereby members receive grants of £2 5*s.* to £3 15*s.* towards their purchase, or half the cost of hire. The price of the compresses ranges from £5 10*s.* to £21, and this naturally evokes curiosity about their contents. The name suggests a new kind of ray, but it is not a name employed by physicists, and in fact the rays are from radium. It is to this radium that the benefits of treatment are ascribed; for we are told that though some of the compresses are heated electrically the heat "merely brings the blood to the surface, when the great energising and penetrating powers of the rays from the mild radium ore enter the affected parts." The radium content is certainly (and perhaps fortunately) "mild," varying from an amount equivalent in element to 0·013 mg. to a maximum of 0·1 mg. in different types of compresses. At current market prices the value of the radium would vary from one to eight shillings.

Mr. Bailey is reported as making the naïve remark that "the Q-ray compress must obviously be accepted by the medical profession by virtue of its having been tried out so extensively in the leading hospitals." No information however is given about the names of the hospitals or the results of the tests and we have failed to find any account of the merits or demerits of these compresses in the medical journals of this country. There appears indeed to be no prima-facie evidence for their efficacy. We are accustomed to think of the introduction of new remedies only after much toil, great patience, trustworthy observation, and critical insight. When these have been brought to fruition the medical profession is seldom slow to put them at the service of man.

SERUM PHOSPHATASE AND ASCORBIC ACID

IT has been known for some years that the activity of some of the animal phosphatases—particularly "phosphomonoesterase type A_1" [1] which appears in increased amounts in the blood plasma or serum in Paget's disease, in hyperparathyroidism, in rickets, and in certain other diseases affecting bone—may be enhanced by the addition of magnesium salts. The increase in activity, though appreciable, is usually not very great. A few other agents have been reported as having small effects, either adjuvant or inhibitory, on this enzyme. Recently Thannhauser [2] and his collaborators at the Boston City Hospital and the Tufts College medical school have announced (1) that ascorbic acid (vitamin C) is a very powerful activator of serum phosphatase and (2) that the large increase in the phosphatase activity of the serum that may be observed in certain diseases is not due to an actual increase in the amount of this enzyme in the circulating blood but rather to its activation. They do not say that this activation is caused by there being more ascorbic acid in the blood—indeed something of the order of a 5 per cent. solution would be necessary for the maximum activation of serum phosphatase—and they prefer to attribute it to a co-enzyme, of unknown nature, present in these conditions in the circulating blood. This possibility had not escaped earlier investigators, but since no positive evidence had ever been found in its favour it was assumed that the rise in enzymic activity is due to a genuine increase in the amount of phosphatase per unit volume of blood-serum, directly associated, in diseases affecting bone, with abnormal activity of, or possibly with damage to, the bone-forming cells, which more than a decade ago were shown to be a rich source of phosphatase. If Thannhauser and his colleagues are right in their two claims, particularly in the second of them, it will be necessary to revise present views of the connexion between phosphatase activity in bone and in blood plasma on the one hand

[1] Folley, S. J., and Kay, H. D., *Ergebn. Enzymforsch.* 1936, 5, 159.
[2] Thannhauser et al., *J. biol. Chem.* 1937, 121, 697; Maddock, S., Thannhauser, S. J., Reichel, M., and Grattan, J., *New Engl. J. Med.* Jan. 27th, 1938, p. 166.

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and the growth and disease of bone on the other. The findings of King and Delory,[3] however, throw doubt on one at least of them; for careful experiment with several samples of ascorbic acid failed to substantiate the activating effect of vitamin C on serum phosphatase. If one of Thannhauser's claims is ill founded, the other becomes less secure.

TUBERCULOSIS SURVEYS

ELSEWHERE in this issue (p. 568) will be found summarised a preliminary report of a tuberculosis survey carried out by Dr. Noel D. Bardswell in Cyprus. The accumulation of such local tuberculosis surveys is by now bulky and covers a considerable period. Their administrative and human aspects have altered but little with the years; the advances made in the technique of diagnosis are reflected in the changes made in the methods of routine examinations. In the earlier surveys more prominence was given to the stethoscope than to X rays, whereas of late there has been a pronounced tendency to relegate the stethoscope to a place of second importance, and to exalt the virtues of screening and radiography with the help of portable X ray outfits. Dr. Bardswell apparently decided, doubtless for good reasons, to do his work without this modern and perhaps, to Cypriots, alarming apparatus. In the matter of tuberculin testing also certain swings of the pendulum are to be noted. The Pirquet test is with difficulty holding its own in the face of the disparaging comparisons made between it and the Mantoux test by Prof. Th. Madsen and his school in Denmark where the latter test is gaining ground. Both these tests labour under the disability of causing pain, however slight, and Dr. Bardswell has found it expedient to use Moro's quite painless test with the inunction of a tuberculin ointment. He admits, however, that the Mantoux test would have brought the Cyprus tuberculin observations more into line with similar surveys in other countries. It is impossible to read his report, full of shrewd observations on the foibles of his fellow-beings, without coming to the conclusion that, in such a delicate mission as his, tact and diplomacy are as essential to success as is a profound knowledge of the scientific aspects of the problem. His survey is, in fact, not only a study of the behaviour of tuberculosis in Cyprus, but also a determined attempt on the part of the West to understand the East.

VITAMIN A AND PREGNANCY

IN rats deficiency of vitamin A is known to favour difficult labour. Dr. W. H. Newton,[4] who has been pursuing this observation, finds that the proportion of difficult labours is far exceeded by the proportion of uncompleted pregnancies. His method was to put batches of rats on a diet deficient in vitamin A at different ages varying from 3 weeks (the time of weaning) to 65 days. One control group of rats was given a supplement of carotene daily; another group received a supplement of vitamin E, deficiency of which might otherwise have been held responsible for the incomplete pregnancies, but this addition made no appreciable difference. As a rule the rats became pregnant when about three months old. Among the 75 deficient animals, 12 showed no sign of pregnancy; in 8 the pregnancy was not completed, apparently because of reabsorption or abortion; and in 8 others pregnancy was incomplete for reasons undetermined. On the other hand there were no incomplete pregnancies or failures to conceive among the 21 animals receiving the carotene supplement. Judging by vaginal smears, which contained large numbers of cornified cells but no spermatozoa, Newton thinks that the failure to conceive was due to failure in copulation. The pregnant rats deficient in vitamin A had a higher proportion of dead fœtuses in their litters and the average weight of the fœtuses at birth was smaller. Twelve cases of difficult labour were observed; 3 of these rats were allowed to recover, 4 showed no apparent sepsis apart from possible secondary infection of the necrotic fœtal material in the uterus, but 5 exhibited definite infection of the uterus or the surrounding tissues. The degree of vitamin-A deficiency produced in the rats made respiratory infection hard to control among them but no xerophthalmia was seen. How far comparable deficiency prevails amongst women and how far these effects in animals have any human counterpart is not known, but with so many obstetric disasters attributable to lack of vitamin A it seems reasonable—until the contrary is proved—to ensure that pregnant women receive a sufficiency of that vitamin.

STANDARDS OF COMMERCIAL ADVERTISEMENT

THE Proprietary Association of Great Britain is honourably striving to abolish by voluntary effort the unscrupulous advertisement of medical remedies and surgical appliances. Two years ago the House of Commons neglected the opportunity to set up uniform standards in these matters when it failed to give a second reading to Mr. Duckworth's Medicines and Surgical Appliances (Advertisement) Bill.[1] The rules now made by the Proprietary Association oblige its members to give an undertaking which in effect incorporates the standards of the Duckworth Bill. They undertake not to advertise or offer for sale to the public any medicine or treatment which is held out as being effective in regard to diseases like Bright's disease, cancer, tuberculosis, diabetes, epilepsy, lupus, or paralysis, or in regard to blindness, deafness, or sexual ailments, or any medicine for procuring the miscarriage of women. The Association's standard, indeed, is even higher than that of the Duckworth Bill; for, in certain cases where the Bill forbade the advertisement of remedies promising a cure, the Association's undertaking forbids advertisements which even commend a particular treatment. This attempt to control by private enterprise the deplorable abuses of advertisement, the exploitation of fear, and the dangerous and fraudulent preying upon gullible men and women is one which deserves recognition and support.

Old-fashioned theory deprecated the policy of trying to make people good by Act of Parliament. Moral suasion and ethical education were to be relied upon to reform abuses and improve standards. This kind of reform, however, is a plant of slow growth; meanwhile in the commercial world the pioneers who set the higher standard are out-distanced by less scrupulous competitors. The enforcement of a decent uniformity is difficult without statutory backing. When the Duckworth Bill failed in 1936, the accustomed arts of obstruction were employed. Opponents welcomed the principle while rejecting the opportunity. Reform? Yes, of course, but never this particular reform. One of the severest tests of Parliament as a legislative body is its treatment of non-party measures on their own merits. The conflict of interests has strange results upon a private member's

[3] King, E. J., and Delory, G. E., *Chem. & Ind.* 1938, **57**, 85.
[4] *J. Physiol.* 1938, **92**, 32.

[1] See *Lancet*, 1936, **1**, 787

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Bill. The senior member for Oxford University has recorded the temporary setback to his ultimately successful Matrimonial Causes Bill through causes strangely remote. It stood on one occasion third in the list for discussion. The first measure in the list was one for correcting some mistake in the Road Traffic Act, the second was one which concerned the sale of ice-cream on Sundays. Opponents of the second proposal, to prevent its being even discussed, organised prolonged opposition to the first with which they would otherwise have had no quarrel. The result was naturally detrimental to the third. Mr. Herbert's ultimate success, however, shows what a private member can achieve. When may we hope for like success with a second edition of the Duckworth Bill?

THE PHYSIOLOGY OF EMOTIONS

SOME observations on the physiological reactions of patients in a sanatorium for nervous diseases when under the influence of emotion have been made by Dr. H. I. Schou.[1] After a conversation directed to topics of known capacity to arouse emotion, physiological determinations, controlled by previous and subsequent examinations, were made of the area of blushing, skin temperature, metabolic rate, invisible perspiration, gastric secretion, blood-sugar, and adrenaline content of the blood. Remarking that "when a neurologist daily speaks to nervous patients he may make a number of interesting observations of the blush of shame," Dr. Schou shows that in any one individual this has a uniformly localised starting-point and that it is accompanied by an increase in temperature of the skin which is, however, much more extensive and therefore separate from the blush. A fall in temperature with emotion is common in the feet and hands. This is not due to alterations in sweat secretion but must arise from arteriolar changes. These changes are accompanied by a lability of the invisible perspiration, which may increase by 100 per cent. or more. "In slight, mixed emotions" the metabolic rate may rise by 23 per cent.; presumably as a result of alteration of muscle tone or through involuntary movements. Emotion affects the stomach secretion, as shown by the difference in Ewald test-meals before and after arousing "slight, artificially engendered emotion." There is a distinct decrease in the free and total acid. The type of emotion concerned is not detailed, but it is noteworthy that these results are strikingly different from those of others, for example of E. Wittkower (1935) who showed that in some persons increased secretion was a regular accompaniment of suggested emotion. The degree of anxiety induced by the test-meal, quite apart from the intentionally aroused emotion, is likely to be important. Blood-sugar increase is a less regular phenomenon in these investigations; it often occurred some time after the arousal of emotion and was followed by hypoglycæmia. In drawing conclusions from results obtained by the adrenaline testing technique (Cannon and Hoskins's rabbit intestine method) Dr. Schou is rightly cautious and would prefer to await better methods. He points out that the effects of emotion on certain biochemical determinations is too often forgotten. The fact that even "slight, mixed emotions" give rise to widespread somatic changes in human beings suggests a hope that further investigation of such matters may lead to therapeutic results in manic-depressive psychosis.

The limitation of outlook in these experiments is on the psychological side, and there are no indications in them that unrecognised emotional tensions or attitudes may exist and affect function. For example, although Dr. Schou refers to blushing as the "blush of shame," notes its occurrence in women more than men, and describes its predominance at puberty and the menopause and with exposure of the body, he feels that anxiety "seems to be a far more dominating cause than actual shyness or feeling of shame." Blushing is for him the result of a sudden rise of metabolic rate, even although its rapid occurrence makes this difficult to believe. What we call emotion may itself be a phenomenon so complex as to require analysis before its physiological accompaniments can be usefully differentiated.

[1] Some Investigations into the Physiology of Emotions. By Dr. med. H. I. Schou, Hospital for Nervous and Mental Diseases, "Filadelfia," Dianalund, Denmark. Copenhagen: Levin and Munksgaard; London: Humphrey Milford, Oxford University Press. 1937. Pp. 111. 8s.

DIABETES AS A PUBLIC HEALTH PROBLEM

Is diabetes a *public* health problem? Dr. Charles F. Bolduan[1] thinks it is, and an important one. It is, of course, a matter of definition. Diabetes is not a public health problem in the sense that we know of any way in which action on the part of the community will diminish the individual's liability to diabetes, nor is the diabetic liable to communicate his disease to his neighbours or by virtue of his disease be a nuisance to them. Dr. Bolduan's argument is that because modern treatment can improve and prolong the lives of diabetics, it is for the public health authority to aim at getting the largest possible number of diabetics recognised and treated, and he goes on to outline the programme of the New York Diabetes Association, founded for this purpose in 1934. It stimulates the interest of clinics and hospitals in diabetics and encourages their coöperation; it develops facilities for the education of both doctors and the public in diabetes; it tries to get insulin provided for the poor, trains nurses in the special nursing of diabetes, and generally works for the improvement of the lot of the diabetic. Dr. Bolduan says it has been very successful. We can believe him, and the inference is that five years ago the New York diabetics were being inadequately treated. Yet that was ten years after the introduction of insulin. The medical profession did not apparently give the community the benefit of a new piece of knowledge within that time. The reasons were no doubt complex, such as the practising doctor's failure to recognise and master something new and valuable and to distinguish it from the new and spurious; the economic difficulties and the ignorance of patients; the haphazard organisation of medical services in the community; and the fact that to understand and administer this treatment efficiently required a good deal of preliminary study. But the fact that a special drive was needed in order to get the comparatively straightforward management of diabetics properly carried out suggests that in many other directions the community is not deriving all the benefit it might from its doctors. Such a state of affairs is not confined to one country. It could be exemplified in England in connexion with diabetes, rheumatism, anæmia, tuberculosis, and many other conditions, and the complex causes of it, as well as the means of improvement, call for a great deal of study and experiment. The whole of medicine is still very much of a problem in public health in the sense that medical knowledge is far from making its full contribution to the health of the public.

[1] *Amer. J. publ. Hlth*, 1938, 28, 21.

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SPECIAL ARTICLES

WATER-BORNE TYPHOID

BY DUNCAN FORBES, M.D., B.Sc. Edin., D.P.H.
MEDICAL OFFICER OF HEALTH FOR BRIGHTON

AT the present time when so much thought is being given to the purity of water as distributed to the consumer, and the steps which should be taken to prevent the spread of water-borne typhoid, I think it worth while to draw attention to some of the earlier water-borne outbreaks. These should give us some guidance in framing preventive measures for the future.

SOME OUTBREAKS IN ENGLAND

Caterham and Red Hill, 1879.—Population, 16,000; cases, 358; deaths, 21. The water-supply was infected by an adit worker suffering from ambulatory typhoid fever and uncontrollable diarrhœa.

Worthing, 1893.—Population, 17,200; cases, 1416; deaths, 188. Before the outbreak men were at work in an adit. Day workers complained of the nuisance caused by members of the night shift defæcating in the adit. A rush of water drove the workers from the adit and polluted water gained entrance to an adjacent well and so to the mains.

Maidstone, 1897.—Population, 34,000; cases, 1700. The gathering ground included arable land near the surface of which were pipes with open joints which conducted water to the springs. Immediately before the outbreak the ground in the neighbourhood of the springs was plentifully covered with human excreta. Colon bacilli were present in 1 ml.

Coventry, 1901.—Cases, 60. There was a shallow well near which a case of enteric fever was nursed, and the ground close by had been excavated just before the outbreak.

Beverley, 1904.—Population, 13,183. There were 400 cases of diarrhœa followed by 32 cases of typhoid fever. An outbreak had occurred in 1885 when the wells were polluted from an adjacent sewage farm. The chalk in the neighbourhood is highly fissured and whilst driving an adit the workmen encountered a strong stream of water heavily charged with surface sand and gravel. The specific pollution was attributed to sewage entering the chalk three-quarters of a mile from the well, but more probably was from a sewage plant or its effluent which discharged into an open agricultural drain some 600 yards from the well.

Lincoln, 1905.—Population, 54,000; cases, 1058; deaths, 125. House drains were found to discharge into the catchwater drain from which part of the supply was drawn. The water before distribution was passed through inefficient sand filters which were raked over from time to time to increase the rate of flow.

Royal Marine Depôt, Walmer, 1908.—Population, 1073; cases, 33. The outbreak was due to infection of water in the swimming bath which was filled by the incoming tide. The intake was within 500 yards from the outfall of two sewers which contained the undisinfected fæces of typhoid patients. The flow of the tide was from the sewers to the intake and the water whilst the bath was being filled resembled storm water.

Swanage, 1910.—Cases, 24. Infection was traced to water from a well near some leaky sewers. Colon bacilli were present in 2 ml. and streptococci in 10 ml. of the well water.

Stroud. 1912.—Population, 13,428; cases, 71; deaths, 9. Men at work in well at the time water was infected but none was found to give a positive Widal reaction or to have typhoid bacilli in the urine (no note is made as to the examination of the fæces). The water in the mains showed *B. coli* in 1 ml. The well was in highly fissured chalk. There were numerous cesspools and probably leaky sewers in the immediate vicinity.

Kenilworth, 1913.—Population, 5990; cases, 43. The sewer which received the drainage from a house in which a typhoid case was being nursed overflowed into a stream between Nov. 17th and 19th. Water from this stream entered an adit from which the water-supply was drawn. Two cases sickened on Nov. 22nd, and 25 cases between Dec. 5th and 12th.

Bedlington, 1918.—Cases, 141; deaths, 21. The contents of privy middens which were emptied on agricultural land and other fæcal matter polluted the river from which the supply was drawn. The water was passed through sand filters which a severe frost followed, by a sudden thaw, had rendered inefficient.

Bolton-on-Dearne and neighbouring villages, 1921.—Population, 20,000; cases, 397; deaths, 45. Two outbreaks. The first was due to polluted water from old mine workings. Coliform organisms were present in 0·1 ml. A second larger outbreak was due to pollution of the public pump well. Coliform organisms were present in 0·1 ml. and *B. enteritidis sporogenes* in 5 ml. The well was open to pollution from privy middens and from a quarry containing scattered fæces, both close to the well.

Buckie, 1931.—Cases, 34; deaths, 2. Typhoid carrier lived in a house which had a pail privy, the contents of which were emptied close to a stream. Considerably lower down in this stream lay a defective and leaking water-main which supplied the infected area. Another possible entry of infection was from under the spout of a well where pails from the above-mentioned house might have been swilled. From the grating below, the water was conducted into the Buckie main supply.

Denby Dale, 1932.—Population, 1400; cases, 75; deaths, 11. One of the springs was supplemented from a stream polluted by drains. The spring water must have been polluted for years but no outbreak occurred until a young woman came from Scarborough to a cottage draining into the stream. She was notified as a case of typhoid on Sept. 17th and was removed to hospital on Sept. 19th. Between Oct. 8th and 20th 50 more cases were notified.

Malton Urban Districts, 1932.—Population, 4500; cases, 270; deaths, 23. At the time of infection there was a case of typhoid in hospital, whose fæces entered the drain undisinfected. The drain was so fractured as to cause disconnexion and its contents discharged into a cavity in the oölite where it quickly disappeared. The underground flow was towards the Lady well 250 yards away from which the supply was pumped. The well water contained colon bacilli in 1 ml.

Bournemouth and Poole, 1936.—Cases, 518; deaths, 51. The infection was spread by milk, but the milk was probably infected by water from a stream which received the sewage of a house in which a carrier lived. Typhoid organisms were at times found in large numbers in this sewage. The sewage was discharged into the stream 85 yards from the cows' drinking-place and their teats may have been infected.

Croydon, 1937.—Population at risk between 36,000 and 40,000; deaths, 42.

	Cases	Primary	Secondary
In Croydon ..	311	295	16
Outside ..	31	28	3
Total ..	342	323	19

A well was infected at a time when men, one of whom was a carrier, were working in it and its water was being pumped unfiltered and unchlorinated direct into the supply.

Those responsible for the purity of water-supplies should study the admirable reports on these and other outbreaks by the medical officers of the Local Government Board and the Ministry of Health, and

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should consider whether their supplies are exposed to similar risks; such a study is likely to be reassuring.

INDICATIONS FOR CHLORINATION

In normal times when no work is being done in the headings, the precautions taken must depend on the character of the soil, the direction of flow of underground water, the rate of the rise of level of underground water after rain, the depth of the cone of depression, and above all the proximity of cesspools or drains and the possibility of a quick flow of sewage from these to the well or its headings. The investigation of these points is the combined work of the water engineer and the medical officer of health, who should consult together and review the position from time to time.

Under such varying conditions it is impossible to say how often well water should be tested bacteriologically. To take extremes; if cesspools or drains discharge their contents into highly fissured chalk upstream or in the vicinity downstream, then the water should be continuously chlorinated. Under such circumstances we should not await polluted samples to warn us of danger. If on the contrary the chalk is compact and the rise of the level of water in the wells is very gradual, even after heavy rains and there are no cesspools or drains within a quarter of a mile, then monthly examinations of the well waters should suffice. Even if colon bacilli are found in 100 ml. there is no need for panic, but samples should then for a time be taken weekly and if the bacilli persist and appear in, say, 20 ml., the water should be chlorinated. The occasional presence of colon bacilli in 100 ml. need not cause any alarm, as practical experience does not suggest that this points to the spread of typhoid.

In 1910 I abandoned routine disinfection after scarlet fever and diphtheria in favour of a "spring clean" because I believed infection came direct from a carrier and not from attenuated scattered organisms. Applying the same principles to typhoid, whilst I dread infection from recently polluted water, I have no fear of gradual soakage from cesspools through compact chalk into underground water fifty feet or more under the surface and a quarter of a mile or more from a well, as even if pollution does occur the organisms are diffused and attenuated. I do not consider that under such circumstances the presence of colon bacilli in 100 ml. indicates a pollution which will give rise to infection.

I have no doubt that the pessimist will picture a typhoid carrier (an uncommon individual) specifically infecting a leaky cesspool which opens into a swallow hole in the compact chalk, and this in its turn draining direct into an underground stream which rapidly carries the sewage to an adit, the whole process being hastened by heavy rains. He will point to tests carried out about 1900 at Croydon when brine and known bacteria washed into a swallow hole or depression in the ground found their way into the Addington well, a distance of two miles, within 48 to 72 hours. But even so the optimist will say that it would be strange if monthly bacteriological examinations of the supply had not earlier shown definite signs of sewage pollution. I will remain an optimist until I am convinced by actual experience (I hope of others) that water-borne outbreaks do occur without monthly bacteriological examinations giving timely warning.

PRECAUTIONS WHEN HEADINGS ARE BEING DRIVEN

It is quite a different matter when men are at work in the headings. Then if the water is not pumped to waste it should be chlorinated sufficiently to kill the typhoid group of organisms in diluted emulsions of fæces. In addition carriers should be excluded as far as possible by blood tests and the examination on more than one occasion of the fæces and urine of each man before he starts work in the headings, though these measures give no guarantee that all carriers will be excluded.

Before descending the shaft the workers should use pail-closets placed on cement floors and the pails should be emptied at a safe distance. The men should put on gum boots just before descending the shaft. Provision should be made for urination at the bottom of the shaft, at intervals in the headings, and near the site of work. Urine should be collected and brought to the surface in pails with tightly fitting covers. No smoking should be allowed underground as this encourages spitting. The workers should be warned of the danger from fæces and urine and should individually sign a pledge not to defæcate in the headings; the temptation may be great when they are working half a mile or more from the shaft.

As to the future, medical officers of health should regard it as their duty to keep themselves informed as to the precautions actually taken to prevent pollution of the water-supply. They should insist on chlorination when men are at work in a well or its headings and when they have reason to fear that leakage from cesspools or drains can find its way quickly into the well, but otherwise only if monthly examinations show the persistent presence of colon bacilli in 100 ml. and their presence at times in 20 ml. or less.

In this paper I have been intentionally dogmatic in the hope that I may provoke informed criticism which will assist the medical officer of health to judge how best to insure the safety of the water-supply of his area.

My thanks are due to the following medical officers of health who supplied me with unpublished information: Dr. O. M. Holden of Croydon, Dr. A. Ledingham of Banff, Scotland, and Dr. R. L. Thornley of East Riding.

CYPRUS: A SURVEY OF TUBERCULOSIS AND MEANS OF CONTROL[1]

"The Cypriot is an oriental. Cyprus is a detached piece of Asia, not Europe."

THE island of Cyprus, with a total population of about 350,000, passed into the hands of Great Britain as recently as 1914, and was given the status and name of a colony in 1925. The British occupation followed centuries of neglect to which is to be attributed the backwardness of the island. In 1935 certain information with regard to the incidence of tuberculosis in Cyprus was placed before the National Association for the Prevention of Tuberculosis. Tuberculosis, it was said, was rife and increasing rapidly. The council of the Association considered the reports received and not only offered £100 towards the cost of the establishment of a tuberculosis dispensary, but decided, after consultation with the Governor of the island, Sir Richmond Palmer, to carry out an epidemiological survey. The council was fortunate in obtaining the services of Dr. Noel D. Bardswell, whose familiarity with the scientific and administrative aspects of tuberculosis was felt to be a

[1] Tuberculosis in Cyprus. An interim report on its incidence and means of control made under the auspices of the National Association for the Prevention of Tuberculosis (Tavistock House North, Tavistock-square, London, W.C.1). By Noel Dean Bardswell, M.V.O., M.D., F.R.C.P. 1938. Pp. 228.

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guarantee of the success of the survey. Mrs. Nita Jays, a highly qualified nurse, with experience of the East and a speaking knowledge of Greek and other serviceable languages, was appointed as nurse commissioner to act, among other things, as interpreter.

The survey began early in November, 1936, and a preliminary account of its operations up to the beginning of June, 1937, has now been issued under the auspices of the National Association. In this relatively short time it has, of course, been impossible to make an exhaustive study, but an interim report was prepared in order to meet the immediate need of the Cyprus authorities for information likely to assist them in the planning of an antituberculosis scheme. It may at once be stated that the tuberculosis problem in Cyprus is, in Dr. Bardswell's opinion, by no means so menacing as was feared. He says reassuringly (p. 2) "the disease presents itself in much the same character, intensity and distribution as in similar countries, perhaps even in a less degree. This means that the problem is one of manageable proportions, and that the disease can be brought under effective control by those measures which have proved successful elsewhere."

Dr. Bardswell's first step in Cyprus was to visit the chief towns of the island in the company of Dr. E. A. Neff, director of medical services. The object of this brief tour of inspection was to ascertain whether the incidence of tuberculosis in the island was high in comparison with that of other parts of the world, and to obtain personal knowledge of the various factors concerned. It was learnt that five-sixths of the people were Greeks and that most of the remainder were Turks; that the standard of life was low, the staple food being bread and olives, that agriculture was most primitive, and that the supply of water was insufficient and irregular. Bovine tuberculosis was happily non-existent, but the consumption of milk was very small. The only existing sanatorium was maintained by the Government, and its 40 beds were always full, their occupants being usually patients in an advanced stage of the disease. What was, perhaps, worst of all was the panicky fear of infection. The abbot of a monastery, interviewed on the subject of a suitable site for a sanatorium, was noticed to give the widest possible berth during the interview to the tuberculosis officer and nurse. This attitude was responsible for much of the hardships suffered by patients, who were liable to be turned out of a village and left to die by the wayside for fear of the infections they might cause. For the same reason, the discovery and examination of contacts were liable to be much hampered. The modesty of the Greek women and the attitude towards women of the Turkish population were other factors militating against the work of a tuberculosis officer. The quotation from Dr. Bardswell's report, which heads this article, is a key to its content.

Little wonder that, in the face of all these difficulties, Dr. Bardswell was in some doubt as to the best lines on which to proceed. He was warned that a tuberculosis dispensary would prove to be by no means acceptable to the town in which it might be established. As he pursued his investigations, he found it difficult to reconcile much of the information obtained with his experiences in England. It became increasingly clear that if the greater part of what he had been told was correct, the difficulty of introducing any effective control and treatment would be overwhelming. So he set out to verify the statements made to him. And in the course of his tours of the island he learnt how vivid, erratic, and almost fantastically unreliable are the creations of a more or less oriental imagination. Dr. Bardswell's essay on truth or the want of it, illustrated by picturesque examples, would have delighted a Pontius Pilate. As the tours of inspection proceeded, the visits to the villages became less and less formal and, in consequence, more and more instructive thanks to the intimate contacts Dr. Bardswell succeeded in establishing with the inhabitants through the good offices of his interpreter nurse.

Though tuberculosis had been notifiable since 1930, Dr. Neff had come to the conclusion in 1935 that the notifications represented less than one-quarter of the new cases. The reasons for this were not far to seek. The standard of diagnosis of chest diseases was low, and the fear of offending patients by notifying them was great among the doctors. But by means of Moro's tuberculin test and his clinical examination of cases in various parts of the island, Dr. Bardswell came to the conclusion that the incidence of tuberculosis in the island is not remarkably high. It would seem that tuberculosis is somewhat more frequent in the Turkish than in the Greek population, to judge by tuberculin tests of children and other observations. The choice of Moro's tuberculin test in preference to the Pirquet and Mantoux tests hinged on the comparatively heroic character of the two latter. The prevailing low incidence of positive Moro reactions—i.e., an average of 6·5 per cent. in 8084 children in the villages and 8·2 per cent. in 1841 children in the six chief towns—was noteworthy. It suggests that the risk of infection in Cyprus is no greater than in similar communities elsewhere. Dr. Bardswell did not observe a dozen cases of definitely tuberculous glands, and the cases he saw of tuberculosis of the spine, hip, joints, and peritoneum were "certainly fewer in number than I would expect to find in a comparable survey in England." He goes on to say that he is unable to confirm or disprove the rumour that the incidence of the disease is slowly increasing, but he suspects that the present slow change in the cultural habits of the people under Western influence will promote rather than retard the spread of tuberculosis.

Although this report is only preliminary, Dr. Bardswell has some important recommendations to make. The appointment of a tuberculosis officer able to devote his whole time to tuberculosis work would in his view be of greater value than any other immediate measure. He suggests that this officer should be British, and should preferably possess the qualifications and experience required by public health authorities in England for a tuberculosis officer; he should also have at least a working knowledge of Greek and should not be permitted private practice. Another recommendation is the provision of a staff of visiting nurses or trained health visitors. A nursing training would be a distinct gain, as in all villages there is much that a capable nurse can do in the way of minor medical and surgical aid. The combining of general district nursing work with that of a tuberculosis dispensary nurse would, as Dr. Bardswell points out, have the advantage of not making the latter too conspicuous as a tuberculosis worker.

The report is beautifully illustrated by photos, charts, and maps, and if it lacks the helpful amenities of a table of contents at the beginning and an index at the end, it must be remembered that this report is only provisional. Dr. Bardswell's work has already been found so valuable that, with the concurrence of the Cyprus Government, the National Association for the Prevention of Tuberculosis has resolved to continue the mission for a second year.

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PARIS

(FROM OUR OWN CORRESPONDENT)

MEDICAL EXAMINATIONS FOR MOTOR-DRIVERS

Now that the motor-car is responsible for more deaths than either the typhoid or the diphtheria bacillus, most civilised nations insist on a medical examination of the prospective driver and refuse him a licence if the report is unfavourable. Germany and the Scandinavian countries rank as civilised in this respect, in the company of Italy, Holland, and the Balkans. But what a Baltic or Balkan State considers essential, such backward countries as England and France are uncultured enough to treat as superfluous. At a recent meeting of the Academy of Medicine, its members were urged by Prof. Pierre Parisot and Dr. G. Richard to help to hasten this much-needed reform. According to the statistics they quoted the human factor is to blame in from 36 to 80 per cent. of all motor accidents. In 1936 there were 4073 deaths in France from motor accidents, and from 50,000 to 70,000 persons are injured every year by the same cause. The benefits to be obtained by eliminating the mechanical factors responsible for motor accidents would seem to be small considering that only some 5 per cent. of motor accidents can be traced to this source. Since the Parisian motor-bus company made a medical examination of its prospective drivers compulsory, there has been a progressive fall in the number of accidents per driver from 1·5 to 0·6 (for 1936). In 1923 there was one accident for every 105,200 travellers, whereas in 1936 the corresponding figure was 212,300. Several other figures were taken from this company's records to show the life-saving significance of medical examinations for prospective drivers. A quotation from a discussion in 1926 in the French Senate discloses that the Minister of Public Works at the time bolstered up his case for doing nothing by holding up England not as an awful warning but as an example to be followed! Prof. Parisot and Dr. Richard crossed their t's and dotted their i's with several case records which had this in common that high blood pressure or some other easily recognisable ailment was alone responsible for the accidents. The root of the trouble is of course this, that legislators as well as motor-drivers are apt to be arterio-sclerotic, mentally or physically.

GROWTH OF INSANITY IN THE SEINE AREA

At the end of 1926 the public authorities of the Seine area had to deal with 14,257 insane persons, only 8965 of whom were interned in the Department's own hospitals. Ten years later, at the end of 1936, more than 20,000 had to be dealt with, and for some 7000 of these the Department had to seek the hospitality of provincial institutions. As the claims of the provinces on behalf of their own insane are also growing yearly, the accommodation they can offer to outsiders is reduced, and there is a distressing disparity between the number of mental hospital beds and the number of candidates for them. But it is an ill wind, &c., and it is to be hoped that since outpatient ambulatory treatment has become a necessity for many mental patients it will be developed on the lines so successfully followed at the present time at the Parisian Henri-Rousselle Hospital where a brave effort is being made to establish mental prophylaxis on scientific lines. As for the underlying causes of the remarkable rise in the frequency of mental disease in the Seine area in the past decade, much has been made of the influx of mentally unstable foreigners and of the ravages of alcohol. But the latter has always been with us, and as for the foreigner, he has so often been made a scapegoat in other fields that he fails to carry conviction here.

DEATH OF DR. SABOURAUD

The announcement of the death of Dr. Raymond Sabouraud will surprise many who, having been familiar with his name and reputation as a dermatologist since their earliest youth, must have assumed that he had passed on long ago. Yet he is the same man whose work on ringworm and allied skin diseases has long been a classic. He was honorary director of the Laboratory of the Town of Paris at the Saint-Louis Hospital, and president of the French Association of Dermatologists. He was also no mean sculptor, and he was much in demand for the engraving of medals struck in honour of members of the medical profession.

ASSÉCUROSE

At a recent meeting of the Society of Medicine of Paris, Dr. Laignel-Lavastine gave the above name to a disease which, in his opinion, is the child of the national health insurance scheme. Assécurose (ad sine cura) is a psychic ailment due to the craving of a patient to be care-free in the enjoyment of sickness benefit, and assécurose is to health insurance what sinistrose is to insurance against occupational accidents. The clinical manifestations of this ailment require, according to Laignel-Lavastine, psychotherapy and professional re-adaptation. While the name is new, the disease surely existed long before the recent introduction of national health insurance into France.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

STUDENTS' THREATS

THE Students Representative Council have protested to the board of managers of the Edinburgh Royal Infirmary against the decision of the board to increase the permanent hospital ticket fee from 12 to 18 guineas. There was even some talk of a strike by the students, who rightly pointed out that the hospital depends to a considerable extent on the assistance provided by the "juniors" in certain departments. However, after further discussion the protest has been withdrawn for it was pointed out by the treasurer of the Infirmary that this increase of fee is the first one proposed during the last hundred years, during which period the facilities provided for students have grown enormously as also has the cost of maintaining the hospital. There is no doubt, of course, that the services rendered by the students to the hospital are of great value and the withdrawal of this assistance would be a serious embarrassment to the staff.

COÖRDINATION OF HOSPITAL SERVICES

Addressing the annual meeting of contributors to the Royal Infirmary of Glasgow Sir James Macfarlane, chairman of the managers, made a vigorous plea for the coördination of hospital services. He said that those interested in such services still awaited the Government's decision on the recommendation put forward by the Cathcart Committee. The increased demands on the Royal Infirmary were

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not only straining its financial resources to the utmost but they were calling for unreasonable services from doctors and nurses.

The difficulties to which Sir James referred are having close attention from the managers of all big voluntary hospitals in Scotland, for they are all faced with an increased demand on their services and hence with an increased financial strain. The difficulty experienced in obtaining enough applicants for the nursing profession, combined with the efforts to shorten the nurses' hours of duty, add considerably to these trials.

PAYMENT BY PATIENTS

Glasgow continues to take the lead in attempting to obtain payment from hospital patients—not, however, without some opposition as became evident at the annual meeting of subscribers of the Victoria Infirmary, Glasgow, last week, when the nomination of the honorary treasurer for a seat on the board of management was defeated by a candidate who was nominated from the body of the room. The meeting was evidently a very crowded one and the allegation was made that the treasurer's defeat was due to a "packed" vote. During the meeting a workers' representative pointed out that £14,000 had been provided during the year by workers' organisations; he objected to anything in the nature of a means test and maintained that anyone who was eligible for National Health Insurance should be eligible for the Victoria Infirmary without such a test.

DEADLOCK AT DUNDEE

The trouble about the proposed alterations in the chair of midwifery in Dundee, to which I referred on Feb. 12th, has not been lessened by a conference held last week between representatives of the Dundee corporation, Dundee Royal Infirmary, and the university court of St. Andrews. The difficulty has apparently arisen out of the failure of the University and the directors of the Infirmary to agree about an appointment to the hitherto associated posts of professor of midwifery and visiting obstetrician and gynæcologist at the Infirmary. Lord McGregor Mitchell, rector of the University, said that from the point of view of the students it could not be denied that in the Dundee Royal Infirmary they had an up-to-date and well-equipped institution most suitable for teaching and that they had as lecturer a lady whose skill and wide knowledge were unequalled north of the Forth. The chairman of the directors of the Infirmary stated that the directors are not opposed to the establishment of the Maryfield unit; but the transference of the chair of midwifery to the maternity hospital at Maryfield, with consequent development of its maternity department, could be achieved only at the expense of the existing services provided by the Infirmary. The directors suggest that there is no room in Dundee for two departments of midwifery and that any expansion should take place at the Infirmary where there is plenty of room for further building and where the running costs would be much lower. The proposed move would discourage subscription to their funds.

There is always doubt as to what part a university should play in the appointment of staff to the teaching hospitals associated with it and the unfortunate conflict in Dundee has brought to light a situation which might well develop in any of the Scottish medical schools; for the attitude of a university and of those who conduct the associated teaching hospitals are by no means always identical.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

PREMATURE USE OF RABBIT SERUM

In a letter written to you last summer I described the experiments being made with antipneumococcal rabbit serum. These experiments are still progressing hopefully, but premature publicity has brought the danger that a promising method may be discredited by too early adoption. To guard against this Dr. Edward S. Godfrey, Jr., health commissioner of the State of New York, has issued a statement deprecating any idea that the use of this new method of serum production will result shortly in the availability of serums highly effective in the treatment of all of the thirty different types of pneumococcus pneumonia. He finds it particularly unfortunate that the hope should be raised that a specific serum cure has been found for the prevalent and extremely serious type of pneumonia known as type III. There is as yet no conclusive evidence that this is so. At the same time the commissioner has made public a resolution adopted by his pneumonia advisory committee which bears on the question. The committee believe that the generalised use of antipneumococcus rabbit serum would be premature though in bacteræmic patients severely sensitive to horse serum or for whom no horse serum is available, its use might be justified. Otherwise, however, they feel that application of this serum should be limited to clinical trial in a few selected hospitals until the value, safety, and limitations of the method are more accurately defined.

This cautious attitude gets support from a report (published in the *New York State Journal of Medicine* of Feb. 15th, p. 245) from the Hospital of the Rockefeller Institute for Medical Research on the treatment of 67 cases of lobar pneumonia distributed among nine different types. In 13 cases of type III no evidence of the therapeutic effectiveness of type III antipneumococcus rabbit serum was demonstrated. The mortality-rate for the remaining cases treated with antipneumococcus rabbit serum of the homologous type was 3·7 per cent.

VITAL STATISTICS FOR 1937

The earlier reports of vital statistics for the last calendar year are arriving. The Metropolitan Insurance Company, always among the first to render an account, describes 1937 as "a star health year." Eight causes of death—typhoid fever, scarlet fever, tuberculosis, chronic nephritis, diseases arising out of pregnancy and childbirth, homicides, accidental burns, and railroad accidents—broke previous records for low mortality. The expectation of life at birth reached a new maximum of 60·7 years. The drop in pneumonia mortality despite an increase of deaths from influenza is significant. The alcoholism death-rate is the lowest since 1921.

HEALTH OF NEW YORK STATE

Dr. De Porte finds the health record of New York State for 1937 "outstandingly favourable" and notes with especial satisfaction the levelling off or reversal of trends which in recent years have given rise to serious public concern. For the first time in ten years there has been an increase in the number of births. The infant mortality-rate (45) was lower than ever before; the maternal mortality-rate (38 deaths per 10,000 total births) represents a reduction

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of more than 20 per cent. from that of the preceding year, which was in its turn the lowest on record.

The death-rates from three of the important diseases of childhood—measles (0·4 per 100,000 population), scarlet fever (0·7), and diarrhœa and enteritis under 2 years (5·7)—were the lowest ever recorded, and the rates from diphtheria (0·6) and whooping-cough (1·3) were practically equal to the minimums of 1936. The sustained decline in the mortality from diphtheria is held to be a direct result of the application of scientifically proved methods of prevention and cure. In 1908 more than twenty thousand cases of diphtheria were reported in this State; last year cases totalled only thirteen hundred. In 1908 there were 2468 deaths from diphtheria; last year only 80. No cases of the disease were recorded in 1937 in forty-two of the sixty-eight Upstate cities and villages with over 10,000 population, and deaths were recorded in only six of these urban communities: Buffalo (2), Binghamton, Endicott, Lackawanna, Syracuse, Yonkers (1 each). The total number of cases of reportable diseases, exclusive of syphilis and gonorrhœa, was considerably below the 1936 total, or the average for 1932–36. Compared with the preceding year there has been no increase in the combined number of deaths ascribed to diseases of the heart, blood-vessels, and kidneys. Although the upward movement of the cancer death-rate continued, the increase was, proportionately, the smallest in a decade. The rise in the tuberculosis death-rate in 1936 was only temporary, and the 1937 rate was the lowest in half a century. Finally, notwithstanding an increase in the mortality from diabetes, syphilis, and influenza, the total death-rate was, with one exception, the lowest in the history of the State Department of Health. A total of 640 cases of poliomyelitis were reported, more than three times the total for 1936 but considerably less than the annual average for the five-year period 1932–36.

AUTOMOBILE ACCIDENT STATISTICS

The 1937 report of New York State's Motor Vehicle Bureau is less cheerful. Since 1925 there have been well over a million automobile accidents in New York State, involving a death or personal injury, the number of deaths being 35,654. The motor vehicle accident experience for the year 1937 was one of the worst in the history of New York State. During this year there were 82,085 accidents in which 3065 persons were killed and 106,482 persons injured.

SYPHILIS AND THE TABOO

Estimates of the incidence of syphilis in the United States range from 2 to 10 per cent. of the population, and the surgeon-general, Dr. Parran, believes that if certification were accurate syphilis would be found to be the chief cause of death. The enormous black population is a reservoir of infection that has no exact equivalent in Europe, for in the large towns, it is said, the average young male negro has a positive Wassermann. During 1937 there were signs that the country was awakening to the magnitude of this problem and that there was an increasing demand for drastic steps to check the disease, especially among young adults, who are most liable to attack. In various universities undergraduate papers started campaigns for compulsory Wassermann tests for incoming students, but at the University of Minnesota, where 7000 students were tested, only 6 positive reactions were found, and it seems that syphilis is very rare among undergraduates generally. The Institute of Public Opinion carried out a number of surveys during the year to discover how far the public were prepared to go in stamping out this scourge. The surveys showed overwhelming majorities in favour of government bureaux to distribute information, government treatment clinics, and a law requiring a test for venereal disease for all persons seeking marriage licences. There were smaller, but definite, majorities in favour of clinic treatment being free, and the punishment of known syphilitics who ignore the treatment provided for them. So far the federal government have not found the 25 million dollars which the surgeon-general estimates is necessary to finance an adequate programme of education and treatment, and the response to invitations to have a Wassermann done has been so immense that existing facilities for treatment have been swamped. This is natural as the organisation of clinics takes time, and pending the introduction of a federal scheme clinics are being provided on many different lines by local health authorities.

Above the legend "No Longer Taboo" the *Literary Digest* of Jan. 1st publishes a photograph showing a large crowd of young men and women with banners bearing the slogans "Chicago will Stamp out Syphilis," and "Friday the 13th is Unlucky for Syphilis." "The first step in the war against syphilis," says the caption, "was to bring the fight into the open. Over 1000 Chicago boys and girls helped in a city-wide campaign."

IRELAND

(FROM OUR OWN CORRESPONDENT)

THE DUBLIN HOSPITALS

IT is understood that the statement made in the public press a fortnight ago in reference to the future development of the Dublin hospitals, of which mention was made in my last letter, although unauthorised is substantially correct. The various hospitals are to submit their plans as soon as ready to the Minister for approval, taking as their basis the recommendations in the report of the Hospital Commission. In the meantime a committee of the hospitals concerned is engaged, in consultation with a senior officer of the Minister's staff, in working out a scheme for a central hospital bureau which will act as an admission bureau to the hospitals, and thereby get rid of the difficulties which, at present, often cause considerable embarrassment to both the patient who requires hospital treatment and his medical attendant. The decision of the Minister has given great satisfaction to the medical profession in Ireland, whose anxiety had been roused by a long period of suspense.

SIALOGRAPHY OF THE PAROTID

SIALOGRAPHY is the radiography of opaque substances injected into salivary glands. Writing in the *Quaderni di Radiologia* (1937, n.s. 2, 139) on its use in the diagnosis of diseases of the parotid. A. Magnoni says that he uses 40 per cent. Iodopin for the purpose. As a contrast medium for salivary ducts this has the advantage over Lipiodol that it is much less viscid. He describes his particular technique in detail and illustrates his paper with sialograms from cases of epidemic parotitis, suppurative parotitis, parotid tumours, parotid lymphadenitis, chronic parotitis, and parotid calculus. In conditions such as a mixed parotid tumour or a parotid lymphadenitis, sialography is seldom of more than academic interest. Unfortunately Magnoni has not always been able to correlate the radiographic findings with accurate bacteriological and cytological information about the saliva, and this leaves some of the interpretations open to doubt.

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GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM VRATCH

I

MANY years ago, before the Bolsheviks were even heard of in our part of Russia, I was driving at dusk through a village on my way back to hospital when a drunken peasant jumped on to the runners of the sledge and demanded that I should stop and treat his headache. He tried to drag me from the sledge by force, so I put my foot on the pit of his stomach and pushed him into a snowdrift. His manner and the strong language he used when he rose were such that a more exact diagnosis and a more medical treatment of his condition did not seem to be indicated. My driver, remarking that the fellow would have a worse head next morning, whipped up the horses and drove on. The trivial incident passed out of my mind.

One day, months later when the snow had gone, an unusual thing happened. A peasant in the waiting-room of the out-patients asked to be seen *last*, in contrast to the usual clamour to be seen first. When all the other comers had been attended to, the moujik, standing rather shyly by the door, said "Doctor, don't you recognise me?" I looked at him carefully and said I did not, then turning to the O.P. register, asked when he had been before and what his trouble was. He said he had never been before and had no ailment, but before proceeding he must know that I recognised him. I told him to come to the point, if he had not been before and was not ill what knowledge had I of him, and what did he want of me in the hospital now? "Doctor, if I tell you you won't be angry with me, will you?" I searched my mind for possible wrongs received, things stolen from the hospital or my house, swindlings at the fortnightly fair where I had bought sheep and pigs; but remembered nothing amiss that I could associate him with and gave him my word I would not be angry.

"Do you remember months ago in the village of —— a drunken man set upon you as you were driving through and demanded that you should stop." The scene came back in a flash. "And do you remember," I said smiling, "the doctor who put his foot in that man's belly and gave a shove! Damn it all, man; we were quits." "Now doctor, don't make a joke of it. It's a serious matter." I thought I must have injured him, so apologised and asked him to tell me all about it.

He then began a long story. He had been drunk and felt sick and thick in the head; so seeing me, he suddenly had the bright idea of demanding an instant cure. But his headache made him angry and he tried to do this by force. He had attacked me and that was wrong. Before he asked my forgiveness, it was necessary that I should know exactly who he was and recall the circumstances. He then very shyly produced a document which ran roughly as follows:—

This is to certify that I [here was a space for my name] have received the apology of—— ——, of the village of ——, on the [space for the date]. And this is also to certify that the elders of the said village of—— after careful examination are convinced that —— ——'s apologies are from the heart. [Date, signatures of village elders and crosses of attestation.]

The whole thing seemed fantastic; an apology was in the circumstances odd but understandable, but the certificate seemed all out of proportion. I made up my mind to see the village elders and try to clear the matter up.

A few days later my round lay through that village and I called on several of the elders. They said they had been horrified by the attack on me. I had done them no harm, on the contrary had been diligent for their good, and it was necessary to eradicate the evil disposition which had shown itself amongst them that night. I pointed out that my quite adequate physical defence had prevented injury to me being laid on the man's conscience, and also that I had attended patients in the village after the episode just as before, so they need not fear the loss of my assistance; but that was not the point. They felt the attack to be a stain on the honour of the village. They had reproached him next day and asked him to apologise. He was defiant in refusal (perhaps through the humiliation of having been rolled over in the snow) and finally brought forward in extenuation the obvious fact that he had been intoxicated. But this for them was no excuse; when sober one must make amends for one's deed when drunk. Then, since as a group they had not been able to persuade him to apologise, they changed their policy and approached him as individuals. They also got his friends to join in their efforts and for weeks the poor devil was followed wherever he went with reproachful eyes. One day he burst upon them with the news that he would go and apologise. But his manner of saying it did not satisfy them; it was hasty and still somewhat defiant; his heart had not changed. They accepted his consent to apologise as a good sign but not necessarily as an indication of true repentance. Gradually he became more passive and waited patiently to be "released" by the village elders from the yoke of guilt. He then came to me with their certificate.

This narration left several things unexplained. This repentant sinner had been brought once more within their most sensitive and intimate circle, had become again what the village calls "one of us"; after months of communion with him he had been found to be pure in heart. Why then did they need my signature to the certificate of release? Did it mean, I asked, that they could not after all trust him to apologise? They said that they did not distrust him, but that they wished me to know that they felt themselves also to be involved in the insult and hence also in the restoration of the honour of the village.

* * *

This was their explanation. There were of course other reasons for dealing with me in this way. A physician was an object valuable to them. They were helplessly dependent on him and his goodwill, and however familiar he might be as a visitor in their homes and at their councils, they *as a group* could not replace or reproduce him because he belonged to a different civilisation, the culture of the metropolis and of international communications. Towards all members of this culture they looked with abject submission, envy, and sometimes hatred; from this metropolitan civilisation came to them tax gatherers, *political* police (civil order was maintained, as this story shows, by the villagers themselves in a most

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unbureaucratic way), landlords (for the most part absentee), priests, a few schoolteachers, and a very few doctors. These, one and all, belonged to the metropolis, not to the village. Over all loomed the distant and terrible, revered and incomprehensible figure of the Czar, who, however widely his characteristics ranged over everything Russian, certainly was not "one of us."

It was a sign of affection and trust in me that the village elders did not themselves come crawling to me with an apology, but a sign of latent fear that made them send the certificate. A not unfriendly representative of an alien world, I belonged to the culture of the town, distant from them though familiar with their village ways. The gulf between us narrowed when the relationship was personal, widened when it touched on the doctor's position in the social structure.

This little episode shows something of the way in which the villagers were bound together by ties of love and how they kept the spirit of their community intact. This spirit gave the members strength when they were in accord with it, and they lived in misery and isolation when they broke, in thought or mood, with the opinion and sentiment of their neighbours. The episode also shows how difficult it was for them to include a member of the alien caste in their way of thought and living.

* * *

Some of the social history of the next few years is well known. The Bolsheviks came to power and made all things new. The peasants were collectivised, many were forcibly moved to public works, many more were driven by starvation to seek a living in the towns. The new social unit became the factory, and the old village organisation ceased to be typical for the Russian people. But its spirit did not die.

* * *

Seventeen years passed, and an Intourist traveller brought back from one of the large new cities a collection of factory wall-newspapers (the placards on which anyone may freely criticise anyone and anything except the essentials of the New Régime). Most of the contents related to the factory, statistics, how the shock workers were breaking records, sport, factory-theatre and music news, and so forth. Down in a corner (always the same corner of each issue) there was a series of notes which at first glance seemed of the most trivial significance. But their spirit was reminiscent of the village I have mentioned, and heaven knows how many thousand like it. The notes ran somewhat as follows: "We do not like the way Sonia —— does her work. She doesn't show the right spirit; she slacks." Several times was she thus publicly reproved; later she was said to show signs of adopting the proper attitude. Finally Sonia was declared an enthusiastic worker who had entered truly into the spirit of the Revolution.

On reading this my mind went back to the peasant whose heart was changed by the silent but not harsh pressure of the group; the steps in this re-entry into the community seemed to be remarkably similar in the two cases; in spite of the greatest imaginable change in the economic and political life the behaviour of the group to a wayward member remained the same. The village spirit, the need to feel that everyone was "one of us," had re-emerged; and I have no doubt that this plays its part in strengthening and consolidating a régime which often seems to us in the West to be based mainly on force.

PUBLIC HEALTH

THE MINISTRY OF HEALTH AND CROYDON

Sir George Chrystal, secretary to the Ministry of Health, has sent a letter to the town clerk of Croydon in the following terms:—

I am directed by the Minister of Health to inform you that he has considered Mr. Harold Murphy's report on the public inquiry held by him into the causes leading up to the outbreak of typhoid fever in the county borough of Croydon in October and November, 1937. Sir Kingsley Wood, who has followed the course of the epidemic with the deepest concern, finds himself in agreement with the findings of the report which he has no doubt have been also studied by the corporation with the object of applying the lessons to be drawn therefrom for the guidance of their administration hereafter and in particular as affecting the conduct of their water-supply service.

The Minister is glad to observe that Mr. Murphy has been able to commend the skill and care with which cases of the disease were handled once they had been reported and the efficient character of the hospital arrangements, the nursing and the general medical services of the borough. On the other hand he cannot but feel that the corporation will share his disquiet at Mr. Murphy's finding (as regards the water service) that the organisation of the administration of the borough was such as to lead to "both misunderstanding and lack of communication between the responsible officers of the Corporation in connection with the work." Sir Kingsley Wood trusts that the corporation will at once review the *whole* field of their work in the light of this important consideration. A fundamental condition for the successful discharge of administrative responsibilities of the magnitude and complexity of those committed to the corporation is the effective collaboration and coöperation of all the branches and departments into which the work must of necessity be divided. Mr. Murphy's report enforces the painful reflection that if this obvious truth had been sooner and more perfectly realised the calamity which we now have to deplore might have been averted.

The Minister cannot too strongly impress on the corporation the necessity for giving their immediate attention to this serious criticism and he will be glad to be informed at an early date what steps they propose to take to remedy what experience has unhappily shown to be a grave defect in their administrative arrangements.

I am directed to request you to draw the attention of the corporation to certain other points in the report which he considers to be specially important.

The first is Mr. Murphy's finding that the borough engineer's duties covered so wide a range of matters as to make it impossible for him to give detailed personal attention to the highly important subject of water-supply, and his consequential suggestion that the Croydon water-supply should be under the direction of a fully qualified water engineer reporting to a water committee and keeping in close touch with the medical officer of health. The Minister commends this suggestion to the corporation. In his view the water engineer should be a chief officer of the corporation directly responsible to the water committee. He also considers it essential that the

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water committee and the water engineer should work in the closest coöperation with the public health committee and the medical officer of health in all matters of common concern. He will be glad to be informed that the corporation are making the necessary arrangements.

Reference is made in the report to representations made at the inquiry that it would be of great advantage in dealing with an epidemic of this kind if there were means of securing closer contact and more ready communication between the medical officer of health and the general body of practitioners so that all the information available from time to time as to symptoms and possible causes could be pooled and distributed. While recognising that the sole responsibility for dealing with an outbreak must, as the report emphasises, rest with the medical officer of health, the Minister, as he has previously stated in Parliament and elsewhere, considers it important that all practicable steps should be taken to secure the effective coöperation of local practitioners in this as well as in other matters with which the medical profession, as such, is concerned.

The Minister appreciates the importance which the corporation doubtless attach to bringing the water from Addington well back into supply at an early date subject to necessary safeguards, and he does not dissent from the conclusion in the report that, with due attention to the gathering ground and suitable chlorination, there is no reason why the Addington well should not provide a perfectly healthy drinking water. The arrangements to be made for the treatment of the water are matters on which the corporation will no doubt seek expert advice and the Minister understands that they have already appointed consultants for this purpose.

In this connexion, the council will no doubt pay particular attention to the view expressed by Mr. Murphy on the evidence submitted that analysis of the water from the corporation's chalk wells should be made more frequently than has been the practice in the past.

In addition to the general and fundamental need for improved coördination of the work of the committees and officers of the council and to the particular points to which I have referred above, the report deals with a number of other matters which merit, and will doubtless receive, attention. The Minister will be glad to learn from the corporation at an early date the result of their consideration of the issues raised and to be informed generally of the action to be taken in the light of the report. If the corporation so desire, the Minister would be happy to arrange for his officers to discuss with them and their advisers any points arising on which it is thought they can be of assistance.

Croydon Town Council decided on March 1st to appoint a special committee of 11 to consider this letter and the report of the inquiry.

From Their Own Doctor

The main objective of the February stage of the national health campaign is to encourage the public to assist in the diagnosis of tuberculosis and the venereal diseases in the earliest stages, "and to take medical advice from the very beginning, from their own doctor, from the dispensaries and clinics of local authorities, and from the hospitals." In a letter to members of the London public medical service, the secretary, Dr. Alfred Cox, remarks that this is an aim that the service can whole-heartedly encourage. The family doctor can direct his patients where he thinks they will receive adequate treatment, and, what is very important, can keep his eye on possible family contacts. In no part of his practice can the doctor's tact and personal knowledge of the family be more useful. In the course of his letter Dr. Cox refers to "a common complaint made by general practitioners that health visitors are apt to urge every person they find with a cough, to see the tuberculosis officer whether there is a doctor in attendance, or not. This tendency should be fought every time it is encountered. Patients should be told that their doctor will see that they are sent to the tuberculosis officer if he thinks it necessary. A letter should be sent to the M.O.H. protesting against a practice which is perhaps justifiable when the person has no doctor, and cannot, or will not, afford to get one, but is quite unjustifiable when a doctor is available, as it is to subscribers to this service."

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED FEB. 19TH

Notifications.—The following cases of infectious disease were notified during the week; Small-pox, 0; scarlet fever, 2287; diphtheria, 1590; enteric fever, 17 (30 "expected"); pneumonia (primary or influenzal), 1073; puerperal pyrexia, 166; cerebro-spinal fever, 41; acute poliomyelitis, 6; acute polio-encephalitis, 0; encephalitis lethargica, 3; dysentery, 185; ophthalmia neonatorum, 108. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Feb. 25th was 4822, which included: Scarlet fever, 812; diphtheria, 1321 (carriers 43); measles, 1361; whooping-cough, 284; puerperal fever, 16 mothers (plus 7 babies); encephalitis lethargica, 284; poliomyelitis, 1. At St. Margaret's Hospital there were 30 babies (plus 12 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there were 2 (0) deaths from enteric fever, 31 (5) from measles, 3 (0) from scarlet fever, 20 (3) from whooping-cough, 39 (3) from diphtheria, 55 (17) from diarrhœa and enteritis under two years, and 42 (4) from influenza. The figures in parentheses are those for London itself.

Stockport and Derby each reported a death from typhoid. Liverpool had 4 deaths from measles, Manchester 3. Liverpool also reported 8 fatal cases of whooping-cough. Diphtheria was fatal in 22 great towns, Birmingham reporting 6 and Liverpool 5.

The number of stillbirths notified during the week was 272 (corresponding to a rate of 42 per 1000 total births), including 36 in London.

THE SERVICES

Army Medical Services

Lieut.-General Sir James Hartigan, K.C.B., C.M.G., D.S.O., retired on March 1st from the appointment of director-general of the Army Medical Services after 38 years' service in the R.A.M.C. and on the Staff, and four years as head of the medical branch. The new director-general is Major-General W. P. MacArthur, C.B., D.S.O., O.B.E., K.H.P., who has been commandant of the Royal Army Medical College, Millbank, since 1935. He is succeeded at the college by Major-General W. B. Purdon, D.S.O., O.B.E., M.C., who has been professor of hygiene there since 1935. Colonel D. T. Richardson, M.C., moves from the War Office to take over the professorship.

Royal Air Force

Air Vice-Marshal Sir Alfred W. Iredell, K.B.E., C.B., K.H.P., retired from the appointment of director of medical services, Royal Air Force, on March 1st. He is succeeded by Air Commodore Albert Victor John Richardson, C.B., O.B.E.

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CORRESPONDENCE

LUMP-SUM SETTLEMENT OF COMPENSATION CLAIMS

To the Editor of THE LANCET

SIR,—Your comments on the conclusions reached by the departmental committee on the maintenance of the lump-sum settlement by agreement of claims by injured workmen against their employers will be welcomed by those with experience of the disadvantages of such settlements. The distinction you draw between lump-sum settlement and settlement is also an important one.

Some of the details of the figures you mention as having been supplied by the rehabilitation division of the New York City Education Department in 1936 are illuminating. The effect of settlement upon the health and earning capacity of 322 men whose claims had been settled by lump-sum payment of £200 or over were studied by following them up for three years. Less than 3 per cent. of the men made a complete recovery after settlement, and the rest of them could be divided into three equal groups, each group covering about a third of the total number, that is about 100 men. One group recovered sufficiently to return to their pre-accident work or similar work; but of this group only half were at work at the time that the investigation closed and their average wage was less by 43 per cent. than their pre-accident wage. The second group had made some improvement but not sufficient to enable them to return to their previous work; of this group again half had found work of a light character, their average wage being down by 54 per cent. The third group had made no improvement at all; only 17 per cent. of them were doing any work and that at a wage reduction of 62 per cent.

A special analysis was made of those patients—64 out of 322—labelled "neurotic." Of these, 1 had made a complete recovery; 13, though not entirely free from symptoms, were fit for their full pre-accident work; 18 were in fair health but 32 did not improve at all. Only 17 of the 64 had received any positive stimulation from the settlement, and in 6 of these the effect was so slight that it was scarcely apparent. Finally, of the 64 "neurotic" men only 17, or 27 per cent., were employed; whereas of the other 258 men 105, or 41 per cent., were employed. Thirteen of the families—i.e., 20 per cent.—were dependent on charity. These detailed figures certainly, as you suggest, support the evidence given by the witnesses from the Ministry of Pensions that such settlements are not always in the best interests of the claimants.

There is as much positive evidence available for study on the fate of lump-sum settlements as there is upon their therapeutic value. Of the 322 cases only 4 per cent.—had invested their money successfully and even among these the average weekly return was only 26 dollars—little more than what they previously received in weekly compensation. At the end of three years only 8 out of the 322 men were still in possession of over 80 per cent. of their money; only 24 had more than 40 per cent. of the original sum; and of the rest only 64 had any money left at all. About two-thirds (207) of the men had used some of their money to settle debts; 271 had used some for living expenses (surely the idea for which the sum was intended); 140 had spent money on legal services, 46 on medical expenses, and 59 had used their money to go into business. Of these 59, 29 had failed altogether, 14 were earning little more than their previous weekly compensation payments, and 16 were earning considerably less than their previous weekly compensation and were considered to be on the borderline of failure.

In these 322 cases, then, it is clear that the settlement of the claim played a very small part in rehabilitation. The receipt of a weekly allowance for a specified time is likely to encourage resumption of orderly habits of life and work, while the sudden acquisition of a large sum by a man who is not accustomed to think in terms of banking accounts or investments is apt to be disastrous.

I am, Sir, yours faithfully,

H. ERNEST GRIFFITHS.

Harley-street, W., March 1st.

CONTRACEPTION AND FERTILITY

To the Editor of THE LANCET

SIR,—It is regrettable that a question relating to the results of birth control in general should degenerate into an attempt to defend the proceedings of any particular society which exists for that proclaimed purpose. Dr. Malleson takes the extreme case of a recently married, pregnant woman, maintaining an unemployed husband, to justify the practice of immediate birth control on marriage: but does she really believe that equivalent justification exists in more than a very small fraction of cases in which immediate birth control is applied? There are grounds for objection to the insidious surrender of our racial strength to the short-sighted sympathies of birth control societies and the like, and to the profit-seeking activities of commercial companies.

The threat of war to an empty Empire, and the economic difficulties which must arise during the shrinkage of our population, are issues which ought to be realised now. The subject of birth control is one for national review and national policy, since it is of nation-wide prevalence and of Imperial concern. It is time for the control of birth control.

I am, Sir, yours faithfully,

GEORGE H. ALABASTER.

Welbeck-street, W., Feb. 27th.

To the Editor of THE LANCET

SIR,—Not without reason did the ancients name the delicate arrangement of the ciliated epithelium of the cervix the *arbor vitæ*, a tree that the thunder of the National Birth Control Association and its *rondcuirs* would destroy root and branch in their adherence to and advocacy of highly acid chemicals and the septic finger application of various caps before or in the early days of matrimony.

Quite apart from ethical, religious, or sociological reasons, surely they do not maintain that such fronded epithelium is likely to be unaffected by such irritants, and will accept the conclusive evidence and experience of Gardner Child (p. 89), Beckwith Whitehouse (p. 429), Blair-Bell (p. 336), Meaker (pp. 39 and 125), and others, that such irritation gives rise to conditions which "make the endocervical mucus inimical to spermatozoa by creating a viscosity—such viscosity is a hostile factor, in that viscid secretions impose a barrier which spermatozoa are rarely able to surmount." It was this condition which Mr. Alabaster referred to and which goes on to the erosion and endocervicitis so commonly seen in contracepting patients.

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Seeing that the social, economic, and imperial policy of this country depends upon an increasing rather than a decreasing population, surely the promiscuous donation of advice to nulliparous young women is antisocial, however good the reasons may be for giving such to parous women who would wish to space their childbirths. Only such advice, I understand, is given in the clinics of the Constructive Birth Control Society. Admittedly the problem is a thorny one but it is not without interest to observe that orthodox Jewesses and Roman Catholics are rarely found (in the absence of hypoplasia) to be sterile. Why?

I am, Sir, yours faithfully,

V. B. GREEN-ARMYTAGE.

Harley-street, W., Feb. 25th.

To the Editor of THE LANCET

SIR,—It is misleading to speak of "contraceptive measures" having this or that harmful result without explicitly stating which measures were used and by which type of human subject. Fifteen years ago I had already codified (Contraception, its Theory, History, and Practice, London, 1923) more than 60 physiologically, chemically, and physically different types of contraceptives; of many of these not less than hundreds of different commercial brands exist. Some of these doubtless have the bad effects described, but it should not be forgotten that I laid down as the slogan of the pioneer birth control clinic "Never put in the vagina what you would not put in your own mouth"; when this rule is observed the contraceptives used cannot have the bad effects attributed to "contraceptive measures" (unspecified) by Mr. Green-Armytage.—I am, Sir, yours faithfully,

London, W., Feb. 23rd. MARIE C. STOPES.

To the Editor of THE LANCET

SIR,—As a member of the medical subcommittee of the National Birth Control Association, I should like, if I may, to reply to the letters from Mr. Green-Armytage and Dr. Alabaster in your issue of Feb. 19th. There seems to be some misconception in their minds as to the point which we were attempting to make. Surely everyone who has dealt with cases of sterility (and many such cases come to the birth control clinics) will agree with Mr. Green-Armytage and Dr. Alabaster when they stress the importance of cervicitis and abnormal cervical secretions as factors in the production of infertility. Nor did we wish to raise the moral, social, and obstetric issues involved in the deliberate procrastination of pregnancy. For again we are probably in agreement with your correspondents that there is much to be said on all these counts in favour of child-bearing early in a woman's life. The mere postponement of the first pregnancy, by whatever means, is in itself conducive to sterility, since fertility in the female decreases rapidly with age. The point which we do not consider proven, and about which we wish to join issue with Mr. Green-Armytage, is his contention that the use of certain contraceptives (caps and acid chemicals) before the first pregnancy increases the incidence of cervicitis.

This suggestion of his that infection of the cervical canal commonly follows the use of a cap is a grave one and has far-reaching implications; but it is unconvincing. Might not the bacteria introduced during normal coitus be equally culpable? Those of us who draw our patients from rural areas, where the use of chemical and mechanical contraceptives in early married life is still extremely rare, can quote many cases of nulliparous women who are found, on examination, to have cervical erosions and other evidence of cervicitis. With regard to his point about the upsetting of the physiological *p*H of the vagina, there does not, at present, appear to be any satisfactory evidence that the introduction of acid substances into the vagina has more than a transient effect (owing to the excellent buffering action of the vaginal and cervical fluids) or that the mere lowering of the vaginal *p*H (except by solutions more strongly acid than those used in contraception) can cause erosion of the cervix and cervicitis. These points are actually being investigated by the committee. If the things of which Mr. Green-Armytage complains are liable to induce cervical infection and subsequent sterility in nulliparæ, then why will they not do so equally in multiparæ whose cervices are already more or less damaged? Yet all the evidence accumulated at the birth control clinics, from thousands of cases, indicates that the use of caps and chemicals has no tendency to induce sterility; indeed the fact that they do not do so is often embarrassing to the clinic workers. Not uncommonly cervices which at the first examination are seen to be in a highly infected state clear up after the woman has been using a cap and chemicals for some months.

Mr. Green-Armytage is the plaintiff in this case and the onus of proof lies on him. Without a control series of observations on nulliparous women who have used no contraceptives and an estimate of the percentage of newly married couples (fertile and infertile) using contraceptives, he is expressing nothing more than a pious opinion. Definite information, however, is being collected by that most valuable body, the Population Investigation Committee. We are fortunate in having Mr. A. C. Palmer as the chairman of the medical subcommittee and Mr. L. C. Rivett as a member; and I may add that this committee is not biased in favour of contraception but was appointed, in an attempt to safeguard the public, to investigate and evaluate contraceptive methods, appliances, and chemicals at present in use. The conclusions of this committee are not conjectural but are based on direct clinical observations of thousands of cases and scientifically conducted experimental work. An effort is being made to arrive at the true facts without prejudice. Methods are submitted to controlled clinical trial; rubber appliances and chemical products are subjected to stringent tests for efficiency and harmlessness before they are placed on the committee's list of approved goods. The committee is at present engaged in an investigation into the effect of chemicals on the cervix and would be grateful for any relevant facts and figures which Mr. Green-Armytage might care to place at its disposal.

I am, Sir, yours faithfully,

MARGARET C. N. JACKSON.

Crediton, Devon, Feb. 28th.

VENOUS THROMBOSIS AS A SIGN OF VISCERAL CANCER

To the Editor of THE LANCET

SIR,—In justice to Trousseau and in fairness to myself I feel it necessary to point out that the last paragraph of your annotation of Feb. 19th (p. 448) is misleading, for it suggests that Trousseau regarded venous thrombosis as a sign of gastric cancer only. In my paper in the *Birmingham Medical Review* last December, I translated the statement of Trousseau's into the following words:—

"On several occasions I have asked you to notice that this obliterative phlebitis did not pertain

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exclusively to cancer of the stomach, and that it might occur with cancer affecting any internal organ whatever."

Inasmuch as I reported a case in which thrombosis was the earliest sign of cancer in the tail (*not* head as stated in your annotation) of the pancreas I may fairly claim to be innocent of the error attributed to me. I would add further that since the appearance of my paper I have seen a case in which recurrent thrombosis of the veins of the legs was the only symptom and sign of malignant disease of the prostate.

I was ignorant of the fact that Trousseau himself showed this sign in his fatal illness and am grateful to Dr. J. D. Rolleston for his letter.

I am, Sir, yours faithfully,

A. P. THOMSON.

Edgbaston, Birmingham, Feb. 25th.

To the Editor of THE LANCET

SIR,—I am interested in Dr. J. D. Rolleston's remarks on Trousseau's observation on a "phlegmasia alba dolens" in a limb as a diagnostic sign that a gastric (or other abdominal) disease is cancerous. What is the actual pathological explanation of the occurrence of the venous thrombosis in such cases? J. H. Pleasants, in his analysis of obstruction of the inferior vena cava from all causes (*Bull. Johns Hopk. Hosp.* 1909, **20**, 292), collected 88 cases connected with neoplasms, 46 of which were due to tumour-thrombosis—by which it is meant, I suppose, that tumour-cells are present in the thrombus. Seventeen cases were due to pressure from the tumour. It seems unlikely that the venous thrombosis in the Trousseau type of cases is due to the actual presence of cancer cells in the thrombus. Moreover, not every venous thrombosis in cases of abdominal visceral carcinoma is like "phlegmasia alba dolens." It seems that nowadays in the numerous cases of visceral cancer in hospital wards, observations confirming the truth of Trousseau's pronouncement are seldom of any practical diagnostic value.

I am, Sir, yours faithfully,

London, W., Feb. 26th. F. PARKES WEBER.

USE OF NITROUS OXIDE BY MIDWIVES

To the Editor of THE LANCET

SIR,—In a very important annotation in to-day's issue you remark that the chance of gas-and-air machines falling into disfavour does not lie so much in any risk from their use as in their occasional inadequacy. This risk is a very real one, but it is my experience that if the attendant pays close attention to small details, gas-and-air analgesia in labour is seldom inadequate. Attention to these details is absolutely essential, and it is necessary to adjust correctly the proportion of nitrous oxide to air.

The original Minnitt machine gave a percentage of nitrous oxide that varied with each breath the patient took. It was found on analysis that with very deep breathing, approximately 45 per cent. nitrous oxide in air was obtained, but with very shallow breathing the percentage rose as high as 70. Actually in practice this worked out very well, and it has been my experience that the vast majority of patients obtain quite adequate relief from the use of Minnitt's machine. I believe that this is largely because of the varying percentage of gas.

The new machine produced by the British Oxygen Company gives a constant percentage of nitrous oxide in air, however the patient breathes. There is a dial attached to the machine and, by turning this, the percentage of nitrous oxide can be varied at the will of the attendant; but midwives are not allowed to do this and must give the gas and air with the dial locked at "normal," which is 45 per cent. nitrous oxide.

I have gone very carefully into this question of the strength of gas and I have found that 45 per cent. is usually too little. In a series of cases recently I gave nitrous oxide in air from the British Oxygen Company's machine and turned the dial until I had got what I thought was the correct percentage of gas. I then locked the dial and sent the machine to the British Oxygen Company for analysis. The company reported that the percentage given was 64·4 nitrous oxide in air. I have since done another series of cases at this strength. At the Wellhouse Hospital and at the British Hospital for Mothers and Babies two of the British Oxygen Company's machines have been in use locked at approximately 60 per cent. nitrous oxide in air and this has been found to be the optimum. I think that all machines of this type which are placed in the hands of midwives should be sent out giving 60 per cent. of gas and I am quite sure that no ill effects can result from using a mixture of this strength. To persevere with the fixed 45 per cent. is going to lead to a large number of failures.

There are certain other points to which it is very desirable that careful attention should be paid. The type and fit of the face-piece are vitally important, and the patient must clearly understand how to breathe in the gas. We so often find, for example, that when the pushing-down stage comes, the patient simply puts the face-piece on her face and pushes. She must, however, be persuaded to take five or six breaths of gas and then to hold her breath and push; more breaths, hold her breath and push again. I often hear patients say that they do not obtain sufficient relief just at the last, but I have found that this difficulty can be overcome by giving continuous gas and air after the head is "crowned." Some years ago when I visited the Royal Free Hospital to study their work with nitrous oxide and oxygen in labour, an anæsthetist, Dr. J. M. Oldaker, told me how important it was for the patient to take a few breaths of gas after the pain has gone away, and I have found that these extra few breaths of gas are equally helpful when nitrous oxide and air is being used. If, for example, the pains are coming frequently, the patient can by this means keep herself to some extent under the influence of gas between the pains, so that she does not have to start anew (as it were) with each pain.

It would indeed as you say be a matter for profound regret if the conscientious midwives become impatient with gas-and-air analgesia because it did not provide the relief required. I am convinced from my own observation of a number of cases, now actually running into thousands, that inadequate analgesia is due to an inadequate attendant or to an inadequate proportion of gas in the mixture.

I am, Sir, yours faithfully,

Station-road, New Barnet, Feb. 26th. JOHN ELAM.

STREPTOCOCCAL MENINGITIS

To the Editor of THE LANCET

SIR,—From Mr. E. D. D. Davis's letter in your issue of to-day's date, which refers to mine published on Feb. 12th, I fear that I did not make my meaning clear. I believe that the symptomatology of streptococcal meningitis secondary to infection on the outer surface of the dura mater is a combined anatomical and bacteriological problem. Anatomically that

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secondary to disease of the nasal fossæ should be separated from otitic meningitis. Bacteriologically that which arises from an acute invasion of the previously unaffected middle-ear cleft must be kept distinct from that which complicates chronic otitis media. In my teaching I am trying to persuade the younger members of our profession—not only the otorhinologists—to keep distinct these three clinical types.

I do not ask Mr. Davis to follow me; but, after I have carefully sorted them out, I must ask him not to throw them all together again and then to apply to the mixture words that I have used in reference to one type only.

The words "such cases" in the sentence "neck rigidity in such cases is the first and should be the only symptom" refer in my letter to the "meningitis secondary to an acute infection of the previously unaffected middle-ear cleft." Mr. Davis quotes them as referring to "streptococcal meningitis" in general and to his "notes of cases of meningitis, 35 secondary to ear infection and 16 to nasal infection" in particular. In doing so he "challenges" them as a statement of mine which, under these circumstances, they are not.

My contention is that it is useless any longer to quote such cases as those of Mr. Davis in which no distinction is made as to the pre-existing condition of the middle-ear cleft. We must collect new cases and describe the symptoms of each group. Then it is possible that we may be able to explain the discrepancy between his statements and mine. Two of his are inapplicable to the cases that I see fairly often in the fever hospitals and occasionally here. Perhaps Mr. Davis does not see them; but then he should not apply to them statements based on observations made upon cases of a different type; or infer that my observations are wrong because he applies them to clinical cases about which I was not writing.

I am, Sir, yours faithfully,

Guy's Hospital, S.E., Feb. 26th. T. B. LAYTON.

To the Editor of THE LANCET

SIR,—A letter from Mr. Layton (Feb. 12th) on the subject of meningitis commands the attention and respect of all, and I should like to thank him for his kindly criticism of my paper which you published on Feb. 5th. I wish that I had made it more clear that the paper referred solely to those cases in which meningitis was the only intracranial disease.

We both agree upon the value of neck rigidity as an early sign of meningitis, but surely it cannot be called the first *symptom* even if one hopes that it will be the only *sign*. I have only once heard a patient with meningitis complain of neck stiffness, and that was after a day of severe headache, some photophobia, and several attacks of vomiting.

Increased mental activity can be seen in all forms of acute meningeal inflammation and is not in my experience limited to those caused by the hæmolytic streptococcus. It may be that this feature is more marked in fulminating streptococcal cases because of the septicæmia that not infrequently coexists.

As regards the cases secondary to ear disease, I entirely agree with Mr. Layton that it is important to differentiate between those cases that follow a primary acute infection of the middle-ear cleft and those secondary to long-standing chronic suppuration, because in the latter group there is usually some associated lesion of the dura mater or cortex that requires urgent surgical attention. This class of case was beyond the scope of my paper, one of the main objects of which was to stress the importance of differentiating between those cases following rapidly on the heels of an acute otitis media and those that are seen after one or more weeks of ear discharge or after an operation for acute mastoiditis.

In fulminating cases the disease rushes through the pre-formed spaces in the temporal bone unhindered, to infect the meninges before it has had time to attack the bone. There is no call here for anything more than the simple drainage of pus. At this stage any extensive removal of bone may result in further dissemination. This principle is realised in dealing with acute labyrinthitis and should in my opinion be extended to the cases under consideration.

When acute disease in the middle-ear cleft has had sufficient time to involve the surrounding bone then, and only then, should eradication of the whole disease be considered. Sulphanilamide is a powerful, possibly the most powerful, weapon with which to fight streptococcal meningitis. It should be used without delay and in adequate doses in every case of streptococcal infection where extension to the meninges is suspected. There is no need to wait for the result of a culture of bone removed at operation, any more than there is need to wait for the appearance of a streptococcus in the spinal fluid. We should try to anticipate these events by giving sulphanilamide at the earliest opportunity.

Finally, I think that from the point of view of management there is no essential difference between cases of otitic and nasal origin. In both, the most acute stage calls for the minimum of surgical interference. In cases of longer standing the need for surgery may be urgent; whilst where there is an acute flare-up of a chronic process the need for surgery is imperative, to deal not only with the primary focus but also with some intermediate focus in the dura or brain tissue itself.

I am, Sir, yours faithfully,

TERENCE CAWTHORNE.

Harley-street, W., Feb. 28th.

To the Editor of THE LANCET

SIR,—Mr. Layton says that he has yet to see a case of otitic meningitis secondary to acute invasion of the previously unaffected middle-ear cleft saved by sulphanilamide. Mr. E. D. D. Davis states that in his experience 98 per cent. of cases showing neck rigidity have died in spite of vigorous treatment. The following case may be exceptional, but I think justifies a better prognosis than these two statements suggest.

A boy of 6½ was admitted to the Harrogate General Hospital at 6 P.M. on Nov. 3rd, 1937, with a history of earache on Nov. 1st followed within 24 hours by profuse ear discharge, vomiting, and a temperature of 105·6° F. On admission his temperature was 102·4°. The mastoid was slightly tender at the apex but not red or swollen. The following day (Nov. 4th) there was slight neck rigidity, but Kernig's sign was negative. Lumbar puncture showed turbid fluid under slight pressure. A cortical mastoid operation was done at 5 P.M., pus being found in a few surface cells and the antrum region only. No dura mater was exposed. Ten c.cm. of antiscarlatinal serum were given. The temperature which had risen to 104° after the lumbar puncture rose to 105° after the operation. Pus from the mastoid and the cerebrospinal fluid both grew *Streptococcus hæmolyticus*. Next day, Nov. 5th, head-retraction was more marked and Kernig's sign positive. Treatment with Prontosil was then started and continued daily. No further serum was given. For four days (Nov. 4th to 8th) the child was delirious and incontinent. On the 6th lumbar puncture was repeated, the fluid showing fewer organisms. On the 8th improvement commenced and it was steadily maintained. After Nov. 15th the prontosil, which had till then been

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given intramuscularly, was given by the mouth. A month later the mastoid was completely healed, the ear dry, and the hearing normal.

I think this may be fairly described as "a case saved by sulphanilamide."

I am, Sir, yours faithfully,

Harrogate, March 1st. A. B. PAVEY-SMITH.

CONTROL OF A TYPHOID EPIDEMIC

To the Editor of THE LANCET

SIR,—Surely it is Dr. Taylor's arithmetic that is at fault. His "epidemic" (consisting of five cases), ceased before general inoculation. Dr. Taylor has no justification for the belief that any of the contacts with his cases diagnosed on May 30th, June 1st, June 4th, had contracted enteric. He must be aware of the general opinion of experienced practitioners who maintain that there is a negative period after the inoculation during which infection is more likely than in the uninoculated.

Dr. Taylor has no right to compare the conditions in the Basque children's camp with those obtaining at Croydon or Bournemouth. At Croydon there was a polluted water-supply. The victims actually drank this polluted water. At Bournemouth, milk was blamed for the epidemic, and it was estimated that the incriminated supply went to 10,000 persons. Here again, the milk was polluted by contaminated water. The Basque children drank neither contaminated water nor contaminated milk. As for contact infection it is well known that this is comparatively rare. As soon as the typhoid cases were discovered at the Basque camp, they were isolated and none of the other children was again in contact with them.

Your readers are well aware that if any of the children had developed typhoid fever after inoculation, the excuse would have been made that they had contracted it before inoculation was carried out. I repeat that the experience of the Basque children proves once again that typhoid fever can be prevented by strict attention to sanitation, and I maintain that no amount of inoculation will stop a typhoid epidemic, if pollution of food or drink continues.

I am, Sir, yours faithfully,

REGINALD F. E. AUSTIN.

Queen Anne-street, W., Feb. 12th.

*** We have shown this letter to Dr. Taylor, who writes as follows: "Major Austin states that the Basque epidemic of five cases ceased before general inoculation. At the time I should have been very happy in that belief, but on the contrary I confidently expected many more cases, and tentative arrangements were made by the local authorities for their reception. The first two cases contracted the disease in Spain, the three subsequent cases were probable contacts, and there is no reason to suppose that the goddess of chance having ruthlessly torn these half-starved children from their distant homes should suddenly endow them with a typhoid immunity.

"The control of all epidemics is the same once the polluted source has been discovered and removed—i.e., the problem of contact dissemination. Major Austin states that I have no right to compare the Basque outbreak with the epidemics of Croydon and Bournemouth. When the Addington well was shut down and the infected dairy at Bournemouth closed, then their problem was the same as ours, except that we were in a much worse position. We, of course, did all we could in camp sanitation and hygiene, and provided good food and clean water, but we possessed no elaborate drainage and sewerage systems. Roughly speaking, 4200 alimentary tracts were collected in an emergency camp in a 40-acre field, with open latrines to add to the sanitary problem. Our three proved cases had been living in crowded bell tents. I cannot imagine a happier state of affairs for any active typhoid bacillus.

"He minimises the risk of contact spread, but even doctors and nurses have been known to contract the disease from patients. Public health authorities supervise all contacts of known cases because of this danger.

"Major Austin has raised once again the question of negative phase. The *Lancet* and the *British Medical Journal* both published leading articles on typhoid immunisation and begged to differ. Many eminent authorities agree that the risk of negative phase can be ignored. It is probable that inoculation carried out in the early stage of incubation prevents the disease, but that there is a risk of provocation typhoid in the late stage. I have not yet met any evidence that provocation typhoid has produced a fatal result, but I would point out that enteric fever has a high fatality-rate, and for that reason prophylactic inoculation has a definite place in preventive medicine.

"It will be of interest to learn whether contact inoculation has been employed in the two recent epidemics and with what result."—ED. L.

A HYPOTHETICAL CASE

To the Editor of THE LANCET

SIR,—Your invitation (p. 506) to discuss a hypothetical case in medical journalism is timely posed, for the demand for doctors in Fleet-street to-day is brisk.

Ordinary writers detected in recommending their own books to correspondents are usually in risk of dismissal unless their editor has previously agreed to allow them this form of gratis advertisement. Doctors might not be so sharply treated. For them the question turns on the so-far undefined ethical rules of press writing. I consider these to be:—

(*a*) The anonymity of a Fleet-street doctor must remain complete so long as he is in any form of private practice; but he should not hide behind it when seeking information from his professional colleagues.

(*b*) His gain must be limited strictly to what the paper pays him, and his writing must seek to win him more readers but not a single extra patient.

(*c*) Advice to correspondents should take the form of suggestions to be laid before their doctor for comment. Serious queries are thus helped, and a stopper put on frivolous ones. Furthermore it is an essential safeguard to a man advising people who may be omitting essential facts.

(*d*) His own discoveries and publications are banned matter even in the most indirect form. How otherwise can he claim any impartiality?

A book published under a pen-name may therefore quite properly—the editor assenting—be recommended to readers whereas rule (*d*) should be rigidly applied to books appearing under the true name. The danger of abuse is otherwise very real, although hard cases exist where books have been written by men "in the course of an honourable professional career" whose matter and manner are such that their recommendation to a wide circle would result in no more than a gain from royalties.

In defence of Fleet-street may I say that the sense of responsibility of news editors in medical matters is greater than is generally believed? They are quick to spot the medical publicity-hunter, and disinclined to encourage medical writers who say things they

(*Continued at foot of opposite page*)

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OBITUARY

ALFRED DOUGLAS BIGLAND, M.A.Camb., M.D.Liverp., F.R.C.P.Lond.

THE death of Dr. Douglas Bigland at the age of 51 came after many years of chronic illness. For the past year it had been clear to his friends that he was seriously ill, and in the last six months he was largely confined to his house, though still hoping that he might recover sufficiently to get back to his hospital and consulting practice. He died on Feb. 20th.

A. D. Bigland was the only son of the late Mr. Alfred Bigland, M.P. for Birkenhead East. After leaving Birkenhead School he went to Cambridge and then Liverpool, where he graduated in medicine in 1912. In 1919 he became a member of the Royal College of Physicians of London and was elected a fellow in 1935. After graduation he was house physician and later medical registrar at the Liverpool Royal Infirmary. On the outbreak of war he joined the Red Cross and then the Royal Army Medical Corps, serving at Suvla Bay, in Egypt, and in France. Before the end of the war he was invalided home and returned to Liverpool; soon afterwards he was elected honorary physician to the David Lewis Northern Hospital. At that time he was especially interested in neurology and he established a neurological clinic at that hospital. In 1923 he became assistant physician to the Liverpool Royal Infirmary, acting as junior colleague first to the late Dr. John Owen and later to Prof. John Hay.

The rigours of his war service brought on an illness which was ever afterwards to hamper his career, prevent him from developing his full powers, and by its interruptions to his consulting work place him in a position of insecurity, and finally cause his death. In 1930 his first wife, Dr. Phoebe Powell Bigland, died after a long illness; shortly after he himself fell ill again and he had to spend the best part of two years lying on his back. He returned to work again, and in 1934 was elected to a full physicianship at the Royal Infirmary. Other posts which he held were those of consulting physician to the Maghull Home for Epileptics and the Lancashire Mental Hospital, Rainhill. He was a lecturer in clinical medicine in the University of Liverpool, and he acted as sectional editor to the Tropical Diseases Bureau, covering the subject of pellagra. In his later years he became very interested in asthma, and established a flourishing asthma clinic at the Royal Infirmary.

"*Souffrir passe; avoir souffert ne passe jamais*"; his suffering refined and mellowed him. "To the end," writes one of his friends, "he retained a brave, gay, and lovely spirit. He had learned to enjoy and treasure what he felt were the important things—to do his work to the best of his ability, to earn the gratitude and confidence of his patients, and to possess the respect and friendship of his students and colleagues. He had long made his peace with the limitations which his illness forced upon him; he had a grand courage to go on as long as ever he could, and to accept the fact that he could not do all he wished to do."

Bigland was a sound clinician, proud to follow in the clinical tradition of his old teacher, Dr. John Hill Abram, whom he often quoted. To him, the patient always came first, and he deliberately made time for those little personal touches which made his patients feel that while he was with them his care and thought were entirely for them individually. He was a good teacher, simple and direct. Perhaps he was at his best at his hospital ward rounds, for in spite of his serious sense of responsibility to patients and students, he had a great sense of fun which bubbled up to the delight of patient, nurses, and students alike. But the peals of merriment which at times interrupted the decorum of a formal ward visit brought confidence to the patient and usually rammed home for the student some fundamental piece of clinical knowledge.

A little over three years ago he married again, and he leaves two daughters by his first marriage.

Dr. JOSHUA BOWER DALTON, who died at a nursing-home in Leicester on Feb. 23rd, was a familiar and popular figure in the schools of the county where he had been assistant school medical officer for the last seventeen years. He was a Manchester graduate and after qualifying in 1905 held various appointments before the war when his foreign service left him with some defect of sight. He never allowed this however to interfere with his work, which brought him into contact with a large proportion of the school population by whom he was looked upon not only as doctor but as friend. He was 58 years old.

Squadron Leader DAVID EDMUND STODART, M.B., whose death is reported, was the son of a medical man, D. E. Stodart, F.R.C.S., and himself graduated in medicine at Edinburgh. It was as a combatant officer, however, during and after the late war that he gained distinction. Joining the Royal Flying Corps as a pilot in 1914, soon after taking his medical degree, he served throughout the war and was decorated with the D.S.O. and D.F.C., one of his feats being to perform all the duties of an entire flight, "a record which it would be difficult to surpass." After retiring from the Royal Air Force in 1931 he worked for a time in the dermatological department at the Middlesex Hospital. In 1934, when 52 years of age, he took part in the air race to Melbourne.

(*Continued from previous page*)

would be ashamed to have related before a jury of their colleagues.

Will you allow me, Sir, lest I seem to boost myself or my paper, to remain,

Yours faithfully,

A MEDICAL CORRESPONDENT.

London, E.C., Feb. 26th.

WESTMINSTER HOSPITAL MEDICAL SCHOOL.—A porchway and entrance to the medical school has been opened by Lord Wigram in memory of Kenneth Alfred Wolfe Barry, a former chairman of the hospital.

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PANEL AND CONTRACT PRACTICE

Police Station Calling

THE Medical Practitioners' Union asked the Ministry of Health to give a ruling on the responsibility of an insurance practitioner towards an insured person who has fallen into the hands of the police on a charge of drunkenness. The Minister felt unable to give an opinion except in so far as the question might come before him for formal adjudication on appeal or otherwise, but the real position of the practitioner in cases of this type can be found in the terms of service and is as follows: If the practitioner is summoned for the purpose of providing treatment for a patient who is ill and whose condition so requires, even if the condition is associated with intoxication, he must go provided the patient is within the area of his practice. A certificate of sobriety or otherwise is clearly not a certificate which is necessary for the purposes of National Health Insurance and the practitioner would have a perfect right to charge for it. If it was made clear to the practitioner that he was being summoned merely for the purpose of certifying as to sobriety it would be a matter for his own determination whether he went, and if so upon what financial consideration. If the patient was at a place beyond the area of the doctor's practice the practitioner's responsibility in the matter of visiting for the purpose of providing treatment would be exactly the same as if the insured person had developed an ordinary illness. To sum up, the question to be decided in any specific case is whether the service required is medical treatment and attendance within the meaning of the Act and regulations. If it is, the doctor's responsibility is defined in the regulations; if it is not, his course of action is exactly as if the accused person were one of his private patients.

The Extension of Insurance Medical Services

Dr. H. Guy Dain, in an address which we summarised last week, expressed a belief that if the health insurance system were to be extended so as to become a complete medical service, that would for most practitioners virtually put an end to fee-paying practice. But he viewed the prospect without disquiet. In his opinion the essential feature in medical practice is not how the doctor is paid but what is his relation to the patient. The thing that really matters is free choice of doctor. Dr. Dain appears to have assumed that the introduction of a salaried service would necessarily abolish free choice of doctor, but this view is not generally accepted by the advocates of such a service. It is held that payment by salary need not wholly deprive the insured people of the right they have hitherto enjoyed to select their medical attendants, though it might be necessary to make some limitation of choice. A great increase in the number of persons coming within the scope of the service would probably facilitate the retention of a substantial measure of free choice of doctor. But such an extension of health insurance would cost money, and the debate in the House of Commons on Feb. 9th on national and local government expenditure showed that it will not be easy to find money for further extensions of social services. Most of the expenditure on the existing services, being statutory, increases automatically from year to year. For example, the provision made in 1937 for old-age and widows' pensions showed an increase of £10,500,000 over 1932. It seems safe to assume therefore that when it is thought that the time is ripe for the extensions of health insurance to which Dr. Dain referred, questions of cost reductions will become prominent, and it may appear that economies could be effected by the substitution of a salaried medical service for the present system of capitation payment. A careful examination of the position may show that such a change would not in fact lead to economy, but the question will doubtless arise, and it is well that it should be borne in mind in discussing extensions of health insurance.

Within the Scope

A practitioner gave an insured person a course of intravenous injections for tabes dorsalis and charged fees on the grounds that the service involved the application of special skill (the rest of the formula is well known). He submitted form G.P.45 but the local committee took the view that the service fell within the scope of his obligations. The insurance committee concurred but the last word is with the Minister, because Regulation 46 (4) provides that if on any question referred to the local medical committee under that regulation the insurance committee and the local medical committee are agreed, the committee shall report the matter to the Minister, and the Minister may, if he thinks fit, refer the question for decision to referees. But that does not often happen.

The Final Settlement

We are informed that insurance committees have now received the final figures for the 1937 practitioners' fund, and that the amount available for distribution by way of settlement is rather more than for 1936.

THE LANCET 100 YEARS AGO

March 3rd, 1838, p. 835.

An extract from an account of an investigation by M. L'ABBÉ GAILLARD *on:*

HIGH MORTALITY OF FOUNDLINGS BROUGHT UP BY THE HAND, COMPARED WITH THE MORTALITY OF THOSE SUCKLED

NUMBER of foundlings at Parthenay, 153; died in one year, 54; deaths out of 100 born, 35.

NUMBER of foundlings at X——, 244; died in one year, 197; deaths out of 100 born, 80.

Of 655 children received at X——, only 66 lived 12 years.

Struck with the enormous mortality at X——, the Abbé Gaillard ascertained that the children were equally well attended at the two places, but that at X—— the children were brought up by hand, instead of being suckled, as at Parthenay. The greater number of deaths at X—— took place in the first month after birth; and the mortality was at a maximum in autumn, a fact confirmed by many years observation at X——, and other establishments, where the children are not supplied with natural food. . . .

. . . it appears that of 244 children brought to the hospice in five years, 116 died in the course of the first month = 48 per cent.; that of 123 children born between January and June, 33 died in the first month; while 83 died out of 121, born between July and December. In the first months of the year the mortality was 27, in the last six months 67 per cent.; of 100 children born between January and June, 73 survived the first month; between July and December only 31 survived.

The mortality is raised by extreme cold; in November and December, 1829, out of 29 children admitted, 19 died in the first month after admission; in July and August of the same year 11 died in the first month out of 25 admitted.

These facts show very decidedly the evil consequences of denying infants their natural food, and furnish another argument against the fatal practices of those heartless mothers who abandon, or refuse to suckle their own offspring.

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MEDICINE AND THE LAW

Fee for Emergency Operation in Hospital

A CLAIM for a ten-guinea fee for an emergency operation was successful at Rhyl county court last month. The patient was insured under the national health insurance scheme, which meant that, on production of his card, he could obtain free medical attention wherever he happened to be. He was also a member of a contributory scheme under which he could be treated at any voluntary hospital, the bill being paid by the authorities responsible for the scheme. He was taken ill while staying at Rhyl, and the doctor who attended him ordered his immediate removal to the Royal Alexandra Hospital in that town, where an emergency operation was performed. The maintenance fees of the patient at the hospital were duly paid under the contributory scheme. Later the patient received a bill for ten guineas; this charge, he contended, ought to be deemed as included in the hospital bill. The judge pointed out that the rules of the hospital showed it to be an institution for women and children. A ward had been established with a few beds for male accident cases and emergency operations. The rules clearly stated that charges for attendance in this ward did not include doctor's fees. Judgment was given for the doctor for the amount claimed, with costs.

Ophthalmic Surgeon's Successful Claim

In the Dover county court another claim for professional fees was successful. The patient had disputed the claim and his legal advisers had drawn up a defence and pleadings. When the case came into court at Folkestone, the judge suggested that it was one for reasonable settlement. During an adjournment the patient apparently received information from one of his own medical experts which made it impossible for him to contest the case further. He therefore submitted to judgment with costs, the judge allowing an increased fee for the expert witness whom the plaintiff surgeon had been obliged to call in order to rebut the patient's contention that the operation was either unnecessary or unskilfully performed. The substantial defence seems to have been that the needling of the eye for cataract either was of no use or ought not to have been performed and that the fees charged were excessive. These allegations being withdrawn, the plaintiff (represented by the solicitors to the Medical Defence Union) succeeded at all points.

Allegations of Negligence Fail

A claim for damages against an ear, nose, and throat surgeon failed at the recent Lincoln assizes. The plaintiff was a bricklayer's labourer. It was said that punishment administered to him as a boy resulted in his losing the hearing of his left ear. His case was that his right ear remained good, but in 1932 a swelling developed and his panel doctor sent him to the Lincoln County Hospital. Mr. J. J. Rainforth, F.R.C.S., the defendant, then gave him some treatment of which no complaint was made, and told him to return in a fortnight. He subsequently saw Mr. Rainforth again. The plaintiff alleged that the surgeon directed a nurse to hold his head in a vice-like grip, inserted a funnel in his ear, and did something with a needle. Everything then went black for him, said the plaintiff; on the way home he was staggering and reeling and from that moment onwards he could hear nothing at all. He continued his treatment under Mr. Rainforth at the hospital, and, when he last went there in February, 1933, was assured that his hearing would return in time. In 1937 he had seen a representative of a firm which supplied mechanical devices for the deaf, but nothing could be done for him. He had subsequently written to the defendant surgeon making apparently some financial demand. No reply being received, his solicitors claimed £2 a week until such time as the defendant could give him back his hearing. The defendant repudiated liability and said that the drum had been destroyed by old-standing disease.

Mr. Rainforth gave evidence of his first examination of the plaintiff. He was then very deaf; the drum of the right ear was largely destroyed by middle-ear disease. There was much granulated tissue (which bled easily) and debris. He could see into the middle ear which would not have been possible if the drum had been intact. He cleaned out the ear with cotton-wool and touched it lightly with a probe to test the consistency. He regarded the condition as serious. The plaintiff was deaf and the granulated tissue, if left untreated, would have been a menace to his life. He prescribed antiseptic drops. A fortnight later he saw the patient again and repeated the treatment. He never punctured the ear-drum; there was nothing to puncture. Nor was there anything to lance because the proud flesh was solid. He tried to get the proud flesh healthy, so that the skin would grow over it and heal it. Later the granulated tissue was much less and the skin was beginning to grow. Mr. Justice Finlay, while expressing sympathy for the plaintiff, said that there was no real evidence of anything having been done wrong by the defendant surgeon, nor was there anything in the plaintiff's evidence which was inconsistent with proper care on the defendant's part. He was perfectly satisfied that there had been no failure of care or skill on Mr. Rainforth's part. Judgment was given for the defendant, who was supported by the London and Counties Medical Protection Society, thus disposing of the plaintiff's allegation that the surgeon failed to use reasonable care and performed some kind of operation which was dangerous without obtaining the patient's consent.

THE REYNOLDS PORTRAIT OF JOHN HUNTER

THIS portrait, which has been in the cleaner's hands (see *Lancet*, Nov. 6th, 1937, p. 1117) is again on view in the Royal College of Surgeons. The astonishing change effected by the restorer, Mr. W. A. Holder, indicates the care and skill with which he has done his work, and all will be grateful to him and also to Sir Alfred Webb-Johnson for bearing the cost. In its recent state none of the picture was clear, and little save the face was readily recognisable. Now the face is clear and its complexion plain to see, the right hand is once more a human member, the rich colour of the habiliment is visible, and the well-known anatomical accessories are again displayed. These results show that the pigmentary changes of the picture's earlier period have made relatively little advance in later years—much less, indeed, than there was reason to fear. What is specially gratifying is that Mr. Holder authorises the statement that in his opinion the pigmentary deterioration has substantially come to an end, and that, given ordinary circumstances, the picture's present condition may continue indefinitely, subject to cleaning from time to time as required. What he did to the picture was to remove dirt and treat cracks; and, as already said, the result is as surprising as it is welcome. All this and the fact that the picture's recent deplorable state was due to dirt, not to continued decay, prompt the hope that in the future it will be cleaned somewhat oftener than twice in 150 years.

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PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

IN the House of Lords on March 1st the National Health Insurance (Amendment) Bill was brought from the Commons, and read a first time. Lord Strabolgi introduced a Bill for the registration of hairdressers and to regulate the practice of hairdressing, and it was read a first time. The Royal Sheffield Infirmary and Hospital Bill, the Saint Bartholomew's Hospital Bill, the Blind Persons Bill, and the Population Statistics Bill were read the second time. The Poor Law (Amendment) (No. 2) Bill passed through committee.

QUESTION TIME

WEDNESDAY, FEB. 23RD

Additional Water-supplies

Mr. KELLY asked the Minister of Health the districts where additional water-supply had been provided and the districts where remedial measures were required.—Sir KINGSLEY WOOD replied: Of the 24 areas from which I received reports of shortage of water-supply in 1937 additional supplies have been provided for the urban districts of Brynmawr and Chatteris and the rural districts of Ashby-de-la-Zouch, Colne and Chippenham, Chichester, North Witchford, and Penistone; and the remedial measures required are under consideration in the boroughs of Dartmouth, Falmouth, Penzance, and Tiverton, the urban districts of Abertillery and Stone, and the rural districts of Belper (Turnditch Parish), Barnstaple (West Down Parish), Brackley (Sulgrave Parish), Bullingdown (Horsepath Parish), Hailsham (Lower Dicker Parish), Holsworthy (Black Torrington Parish), Horncastle (Bucknall Parish), Knighton (Kingward Parish), Morpeth (Cherington Parish), Truro (Cubert, Perranzabuloe, and Saint Erme Parishes), and Wisbech (Tydd and Newton Parishes).

THURSDAY, FEB. 24TH

Cost of Living and Working-class Budgets

Mr. LIDDALL asked the Minister of Labour (1) the approximate percentage increase in the cost-of-living index at December, 1937, as compared with November, 1933, in relation to all foods, commodities, and services required by working-class households for the production and provision of which coal was necessary; to what extent the increase in the index figure was due to the increase in the cost of coal; and if he would exclude from the calculations the additional approximate increase in the index figure caused by the rise in the cost of coal usually bought as firing for working-class houses and state it separately; and (2) the approximate cost-of-living index percentage rise at December, 1937, as compared with November, 1933, in relation to all commodities, in addition to or including coal usually bought for working-class houses, as a result of the increase in the cost of coal used for producing the usual commodities and services required by working-class households.—Mr. ERNEST BROWN replied: At Dec. 1st, 1937, the cost-of-living index figure showed a rise of 17 points, or nearly 12 per cent., as compared with Nov. 1st, 1933. During the same period there was an increase of about 10 per cent. on average in the retail price of coal used as fuel in working-class households; the effect of this increase was to raise the cost-of-living index figure by approximately nine-tenths of one point, or about two-thirds of 1 per cent. I regret that the information in my possession is insufficient to enable me to state to what extent the rise in the index number was due to increases in the cost of coal used in the production and provision of the commodities and services required by working-class households, and I am afraid it is impracticable to classify those commodities and services in two groups according to whether coal is or is not required for their production and provision.

Miners' Nystagmus in Durham

Mr. DAVID ADAMS asked the Minister of Labour whether he was aware that in the area of the Consett and Stanley employment committee there were at present 146 men who had suffered, or were suffering, from miners' nystagmus out of a total adult insurable mining population of 20,700, and that 75 of these were at present desirous of obtaining colliery work; and if, with a view to meeting this requirement, he would consult with all colliery owners in the area with a view to arranging for employment exchanges to bring to their special notice particulars of any of their ex-employees seeking colliery work who had contracted nystagmus whilst in their employ immediately they were certified fit for ordinary or light employment.—Mr. ERNEST BROWN replied: I am aware of the position to which the hon. Member refers, which has been the subject of careful inquiry by the Consett and Stanley employment committee. I understand that the committee has invited a panel representative of colliery work-people and employers in the area to examine a suggestion on the lines of that in the second part of the question and I shall be pleased to consider the matter further when I have received the committee's recommendations.

Slum Clearance

Mr. CRAVEN-ELLIS asked the Minister of Health whether, in view of the injustice arising out of the method of assessing compensation for slum clearance under the Housing Act, 1936, to thrifty people who years ago acquired with their small savings a few houses, he proposed to amend the compensation clauses.—Sir KINGSLEY WOOD replied: As my hon. friend will be aware Parliament has on several occasions affirmed the principle that the proper basis of compensation for houses found unfit for human habitation is site value, and this decision was again endorsed after full discussion during the passage of the Housing Bill of 1935. Certain amendments of the law were then made with a view to mitigating hardship, and in the circumstances, as at present advised, I do not contemplate further amendment of the law in this respect.

Delivery of Unwrapped Bread

Sir JOSEPH LEECH asked the Minister of Health whether he was aware of the insanitary way in which bread for human consumption was delivered at the residences of consumers by hand, from baskets or carts, and without covering; and if he would, in consultation with local authorities, devise some by-law to prevent the delivery of bread by this method.—Sir KINGSLEY WOOD replied: I would refer my hon. friend to Clause 14 of the draft Food and Drugs Bill recently issued with the third interim report of the Local Government and Public Health Consolidation Committee, which proposes to empower local authorities to make by-laws as to the handling, wrapping, and delivery of food.

Mr. BANFIELD: Is the Minister aware that the baking industry has for some years paid special attention to this problem with a view to giving the public their bread in the most sanitary condition?

Sir K. WOOD: I hope that is so.

Voluntary Contributors and Health Insurance

Mr. MAINWARING asked the Minister of Health if he could state to the latest available date how many persons had voluntarily entered insurance under the recent extension of the National Health Insurance Acts.—Sir KINGSLEY WOOD replied: Up to Feb. 16th 127,215 applicants had been admitted to insurance under the Contributory Pensions (Voluntary Contributors) Act, 1937.

Sickness Incidence Statistics

Mr. HAROLD MACMILLAN asked the Minister of Health whether statistics showing the incidence of sickness among women and girls in the insured population of England and Wales were tabulated at the Ministry; whether these figures showed the various age-groups and the types of sickness; and, if so, whether he would have the figures made available to the public.—Sir KINGSLEY WOOD replied: The information referred to by my hon. friend is not available in my department and it could be obtained only by reference to the detailed records of the 7000 approved societies and branches which administer health

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insurance benefits. I am, however, considering the general question of a comprehensive investigation into the extent and incidence of various forms of incapacitating sickness amongst insured persons of each sex and at various ages.

Tyneside Boy's Death in Croydon

Miss WILKINSON asked the Minister of Health if he would cause inquiry to be made into the case of Alfred Frampton, aged 15 years, whose parents resided at 81, Albert-road, Jarrow, who was knocked down by a private motor-car on Oct. 26th, 1937, and taken to Mayday Hospital, Thornton Heath, and contracted typhoid while there, being then transferred to the borough council hospital at Croydon, where he died on Jan. 20th, 1938; and whether this transfer occurred during the typhoid inquiry.—Sir KINGSLEY WOOD replied: I much regret to learn of this unfortunate case. I have communicated with the town council on the matter and I will send the hon. Member the particulars I have received.

Rehousing Accommodation for Tuberculous Persons

Miss WILKINSON asked the Minister of Health whether he would consider making provision in the new Housing Bill for a special subsidy to local authorities for the rehousing of persons suffering from tuberculosis who were living under housing conditions prejudicial to their health. —Sir KINGSLEY WOOD replied: Under the existing Housing Acts local authorities may provide houses for persons suffering from tuberculosis and any houses so provided obtain the benefit of the existing subsidies. In addition, the authorities may grant rebates from rent in suitable cases. In the circumstances I do not consider that any special subsidy is necessary.

MONDAY, FEB. 28TH

Supply of Milk to Highland Children

Mr. ROBERT GIBSON asked the Secretary of State for Scotland whether school-children in the Highlands received milk on the same conditions as school-children in Greenock or Glasgow; and if he had any statement to make on the subject.—Mr. ELLIOT replied: The Highland counties, with the exception of the Western Isles and a part of Argyll, are within the areas of the Scottish Milk Marketing Board and the North of Scotland Milk Marketing Board. Throughout those areas the terms on which milk is provided for the milk-in-schools scheme are the same. In the rural areas generally, however, difficulties have been experienced in getting the milk-in-school schemes operating owing to the special problems of supplying milk to small schools in country districts, and there is accordingly a lower percentage of children receiving milk in schools in the Highland areas than in the towns referred to.

TUESDAY, MARCH 1ST

Birching of Young Persons in Scotland

Mr. WESTWOOD asked the Secretary of State for Scotland what action, if any, he proposed to abolish the birching of children and young persons in Scotland.—Mr. ELLIOT replied: The report of the Inter-departmental Committee on Corporal Punishment has just been received and until the Government has had an opportunity of considering it I regret that I am unable to make any statement on the matter referred to in the question.

Financial Difficulties of Scottish Hospitals

Mr. KENNEDY asked the Secretary of State for Scotland if his attention had been drawn to the increasing financial difficulties and debts of Scottish infirmaries and hospitals, showing that the system of voluntary contributions was no longer sufficient to meet the growing pressure of work in those institutions; and if he was contemplating action on the lines of the report of the committee on health services, published in 1936, with an increased measure of State aid.—Mr. ELLIOT replied: In reply to the first part of the question, I am aware that some of the voluntary hospitals have financial difficulties, but there is, I believe, no evidence that the voluntary system as a whole is unable to meet its commitments. As to the second part of the question, the many important and difficult problems involved are being carefully examined, but I am not in a position to make a statement.

Malnutrition and Tuberculosis among South African Natives

Mr. LEACH asked the Secretary of State for Dominion Affairs if his attention had been drawn to the evidence given by Dr. E. H. Cluver, deputy chief health officer of the Union to the Native Labour Committee in South Africa, that three-quarters of the native population was under-fed and that tuberculosis was increasing; and what steps he was taking to prevent these conditions spreading to the neighbouring British protectorates.—Mr. M. MACDONALD replied: I have seen a press report of the evidence referred to in the first part of the question. As regards the second part, active steps are being taken to improve the diet of the natives in the High Commission Territories, such as an extensive scheme in Basutoland to promote the cultivation of vegetables, and in Bechuanaland the expenditure of large sums of money to improve the water-supplies, and the teaching of the value of green foodstuffs. I may add that the question of nutrition in these territories is being examined by the Committee of the Economic Advisory Council appointed to advise on nutritional matters in the colonial dependencies generally. The position with regard to tuberculosis, which is closely linked with the problem of nutrition, is being carefully watched.

MEDICAL NEWS

University of Oxford

The degree of D.M. is to be conferred by decree upon Mr. H. W. B. Cairns, Nuffield professor of surgery; Dr. R. R. Macintosh, Nuffield professor of anæsthetics; Dr. J. Chassar Moir, Nuffield professor of gynæcology and obstetrics; and upon Dr. J. A. Gunn, Nuffield professor of experimental therapeutics.

On Feb. 26th the following degrees were conferred:—

D.M.—G. R. P. Aldred Brown and Joyce Wright.

B.M.—D. M. T. Gairdner.

The Royal College of Physicians of London has given £50 to the University towards an armorial window to be placed in the Old Ashmolean building.

University of Cambridge

Prof. W. L. Bragg, F.R.S., has been elected to the Cavendish professorship of experimental physics in succession to the late Lord Rutherford. Prof. Bragg was appointed director of the National Physical Laboratory last year.

King's College Hospital

Dr. J. A. Drake, dean of the medical school, is retiring under the age limit. He will be succeeded by Dr. J. B. Hunter.

University of London

Mr. R. S. Pilcher has been appointed to the university chair of surgery tenable at University College Hospital medical school.

Mr. Pilcher, who is 35, was educated at St. Paul's School and studied medicine at University College Hospital. He obtained his M.B. degree in 1927 and was awarded the university gold medal. He obtained the M.R.C.P. in 1929 and the F.R.C.S. in 1930, and the following year took his M.S. degree. After holding house appointments at University College Hospital he was appointed Harker-Smith registrar and assistant in the surgical unit in 1929. Till 1932 he was responsible for the Harker-Smith reports on radiotherapy. In 1933 he became surgical registrar at the hospital, and the following year first assistant in the surgical unit. In 1936 he was appointed assistant surgeon. His published work includes papers on the diagnosis of malignant disease of the pharynx, carcinoma of the cervical œsophagus and pulmonary embolism.

The title of professor emeritus of pathology in the University was conferred on Dr. A. E. Boycott, F.R.S., formerly Graham professor of pathology at University College Hospital medical school.

Mr. H. L. Eason, principal of the University, Dr. Edward Mapother, medical superintendent and professor of psychiatry at the Maudsley Hospital, and Mr. Clifford White, senior obstetric surgeon to University College Hospital have been elected to the fellowship of University College.

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University of Glasgow

Six lectures on the treatment of eye diseases will be given on Tuesdays at 4.30 P.M. from March 8th to April 12th. Prof. A. H. Ballantyne will speak on diseases of the iris, ciliary body and choroid; Dr. John Marshall on diseases of eyelids, conjunctiva and cornea; Dr. I. Chesar Michaelson on squint and other defects of muscle balance; and Dr. J. Burdon-Cooper on the non-surgical treatment of cataract. The lectures will be held in the Tennent Memorial Building, Church-street.

Pharmaceutical Society of Great Britain

A meeting will be held at the house of the Society (17, Bloomsbury-square, London, W.C.) on Tuesday, March 8th, at 8.30 P.M., when Mr. F. W. Gamble, Ph.C., will deliver the Harrison memorial lecture. The title of the lecture will be Facing Realities. The Harrison lectureship medal for 1937 will be presented to Mr. Gamble during the evening.

Oxford Graduates Medical Club

It has been decided to extend the membership of this club to all men who are medical graduates of the University of Oxford, and to abolish the subscription to the club. Those who wish to become members of the club under the new constitution should send their title, name, and address, Oxford college, hospital and date of taking B.A. degree, to the hon. secretaries at 99, Harley-street, London, W.1, so that club notices may be sent to them.

Epsom College

The council of the College will shortly elect one or more St. Anne's scholars. Candidates must be fully nine years of age, and must be orphan daughters of medical men who have been in independent practice in England or Wales for not less than five years. The value of the scholarships is dependent on the means of the applicant, the locality and fees of the schools selected. Application must be made by May 1st on a form to be obtained from the secretary of the college, 49, Bedford-square, London, W.C.1.

National Hospital for Diseases of the Heart

A course of lectures which are free to all medical men and senior students is being given at this hospital, Westmoreland-street, London, W., on Tuesdays at 5.30 P.M. Dr. John Parkinson gave the first lecture on March 1st, speaking on difficulties in cardiac diagnosis. This week Dr. Evan Bedford is lecturing on auscultation. Announcements of the speakers and their subjects will be found each week in our Medical Diary.

Royal Medical Society of Edinburgh

At the annual dinner held last week Dr. G. J. Cleland, the senior president, said that this society was now in its 201st session. In welcoming Mr. W. J. Stuart, the guest of the evening, he expressed the students' regret at his forthcoming retirement. In reply to the toast Mr. Stuart said that during the 36 years in which he had been on the surgical staff of one or other of the Edinburgh hospitals the saddest development to him was the diminution in the amount of clinical work carried out by the students. Forty years ago the students had freedom to choose the classes they wished to attend and he did not think that nowadays enough work was done by them in the wards. After an eloquent tribute to the surgeons with whom he has worked, he spoke of the important part played by the Royal Medical Society in the training of Edinburgh students. The members learned from the society how to teach, how to conduct a debate, and how to speak at unexpected moments when they had nothing to say. Dr. R. B. Lucas said that during the past year the society has been very active and its premises have been greatly improved. Dr. W. G. Kerr, proposing the toast of The Royal Infirmary, emphasised the importance of the institution from the point of view of the students who greatly appreciated having all the clinical work centralised and next door to the University. Mr. John R. Little, chairman of the board of managers, said he thought the Royal Infirmary suffered greatly from lack of adequate publicity, and appealed to the profession to assist in informing the public of the hospital's work. Referring to the expense incurred in running the new maternity block, he said that personally he felt that the maternity services should be supported by the State or municipality.

British Congress of Obstetrics and Gynæcology

The eleventh British Congress of Obstetrics and Gynæcology will be held in Edinburgh on April 4th, 5th, and 6th, 1939. Those who wish to read papers should write at an early date to the senior local secretary, Dr. E. Chalmers Fahmy, 7, Chester-street, Edinburgh, 3.

St. Mary's Hospital

Applications are invited for a research studentship tenable at the institute of pathology and research of this hospital. Preference will be given to old St. Mary's students. Further information will be found in our advertisement columns.

Rheumatism Congress at Oxford

An International Congress on Rheumatism and Hydrology is to be held at Oxford from March 26th to 31st under the presidency of Sir Farquhar Buzzard. A discussion on wet and dry climates and weather in the causation of disease will be opened by Dr. G. Edström (Sweden), Prof. De Rudder (Germany), and Dr. E. P. Poulton. The clinical, pathological, and therapeutic aspects of juvenile rheumatism will be discussed by Dr. A. G. Gibson, Prof. F. Klinge (Germany), Prof. L. Findlay, Dr. H. Grenet (France), Dr. Wilfrid Sheldon, and Prof. Horvath (Hungary). Further information may be had from the office of the International Society of Medical Hydrology, 109, Kingsway, London, W.C.1.

Westminster Hospital

On March 1st Queen Mary opened the new home and training school for nurses of this hospital on the St. John's-gardens site. In declaring it open she said she wished it to be known as the Queen Mary Nurses' Home. In his address Lord Wigram, the president of the hospital, said that through the home the hospital hoped to make the nurse's lot a happy one. Here she would have the advantage of sleeping away from her work and yet in bad weather have access to the hospital by a covered way. Comfortable single bedrooms, attractive recreation rooms, a games room, a gymnasium, a badminton court, a roof garden, and a sick-bay and surgery had been provided, while in the preliminary training school candidates who wished to join the nursing staff could undergo a two months' preliminary training course during which they would learn sick-room cookery and the elementary principles of nursing. For nurses on the staff there were also lecture rooms, class-rooms, and study libraries.

The home will house 39 nursing sisters, 201 nurses, 12 pupil nurses, and 59 maids, and its entire cost has been met by gifts, including almost £4000 contributed by the nurses themselves. The Earl of Athlone will open the new medical school in May, and in March of next year it is hoped to open the new hospital.

Smoke Abatement in London

With Lord Snell in the chair a conference called by the National Smoke Abatement Society was held at the County Hall, Westminster, on Feb. 25th. Dr. J. S. Owens said that in 1936–37 the deposits of solid matter in London ranged from 172 tons per square mile at Wandsworth Common to 322 tons at Archbishop's Park, with 53 tons of sulphate at Finsbury Park and 7 tons of tar at Golden-lane. Improvement had been at a standstill for fifteen years, and the amount of sulphur had slightly increased. The proportion of domestic to industrial smoke in London was 2·15 to 1. Mr. W. A. Damon, representing the Minister of Health, said he was convinced that, with very few exceptions, industrialists were as anxious as anyone to mitigate the smoke evil and that far better results could be obtained from coöperation than from threats and fines. A combination of local authorities made it possible to employ a well-trained staff of smoke inspectors. Mr. E. H. Keeling, M.P., advocated the formation of an advisory regional smoke abatement committee for London and Greater London. In Whitehall, he said, the open coal fire reigned supreme. Sir David Milne-Watson, governor of the Gas Light and Coke Company, stated that 75,000 tons of soot fell on London every year. He suggested that local authorities should offer a rebate of 3*d.* in the £ to householders producing no smoke. They should also get powers to proclaim a smokeless zone in at least the centre of London.

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Institute of Child Psychology

Eight lectures on achieving success in life are being given under the auspices of this institute at Friends House, Euston-road, N.W., on Mondays at 6.15 P.M. The first lectures were given this week and next week's will be found in our Medical Diary. Further information may be had from the secretary of the Children's Centre, The Institute of Child Psychology, 26, Warwick-avenue, London, W.9.

Medical Society of London

The 163rd anniversary dinner was held at Claridge's on March 1st, with the president, Mr. J. E. H. Roberts, in the chair. Mr. R. H. Bernays, M.P., Parliamentary Secretary to the Ministry of Health, in proposing The Society, disarmed criticism by saying, "I know nothing about the subject on which I am going to address you to-night," but having done so was sympathetic with the doctors because, like the politicians, they were judged by results. It had not escaped him either to how large an extent Lettsom had anticipated modern practice in his views on nutrition and his advocacy of soup-kitchens, and how prescient had been John Snow, a later member of the society, who had removed the handle of the Broad-street pump and stopped an epidemic of cholera—a great epidemiological deduction, he remarked. And he concluded with an eloquent plea for the closer working together of voluntary and State services, each realising the difficulties of the other. Mr. Roberts, in reply, spoke of the present prosperity of the society; the number of fellows was greater than ever before, the meetings had been better attended, with the result that the meeting-room was now too small for its purpose; but as the society had now acquired the freehold of its site, and in four years' time certain leases would fall in, there would be an opportunity to increase the amenities if members would complete the endowment fund of £25,000. Whatever was done he hoped there would be no change in the character of the society which had always met "to discuss cases together," the company to include physicians, surgeons, and apothecaries. The toast of the Visitors was proposed by Mr. Alex. E. Roche, with penetrating but kindly humour, and Mr. H. L. Eason, principal of the University of London, replied. At the president's request Mr. Hugh Elliot, a great-grandson of Lettsom, then gave some account of the founder and his times. He had listened to his grandfather telling him about Lettsom's funeral, which was very long and quiet. Lettsom, said his great-grandson, though a Quaker was not a dull fellow, for he had arranged a kind of clinical thermometer in which he showed the various degrees of intoxication. The speeches were over early and there was no rush to depart at their conclusion when much good fellowship ensued.

Vacancies

For further information refer to the advertisement columns

Birmingham, Coleshill Hall.—Deputy Med. Supt., £500.
Birmingham, Queen's Hosp.—Res. Surg. Reg., £125.
Birmingham, St. Chad's Hosp.—H.S., at rate of £150.
Birmingham, Selly Oak Hosp.—Res. Physician, £650.
Birmingham and Midland Hosp. for Women.—H.S., at rate of £100.
Blackburn Royal Infirmary.—Cas. O., £175.
Bradford Children's Hosp.—H.P., £150.
Bradford, Grassington Sanatorium.—Asst. M.O., £175.
Bristol City and County.—Asst. M.O.H. for Air-raid Precautions, £500–£700.
Bristol Eye Hosp.—Jun. H.S., at rate of £100.
British Postgraduate Medical School, Ducane-road, W.—Jun. Asst. to Dept. of Pathology, &c., £300.
Burnley, Victoria Hosp.—H.P., at rate of £150.
Burton-on-Trent General Infirmary.—Sen. H.S., £200.
Canterbury, Kent and Canterbury Hosp.—H.S., £125.
Canterbury, Vene real Diseases Clinic.—Part-time M.O., 3 guineas a session.
Chester City Hosp.—Jun. Res. M.O., £200.
Chester Royal Infirmary.—H.S., and H.S. to Ear, Nose, and Throat and Gyn. Depts., each £150.
Chesterfield and North Derbyshire Royal Hosp.—Cas. O. and Fracture H.S., at rate of £200.
Colchester, Royal Eastern Counties' Institution, &c.—Asst. M.O., £400.
Coventry and Warwickshire Hosp.—Two H.S.'s to Spec. Depts., each £150.
Dagenham Urban District Council.—Deputy M.O.H., £600.
Derby, Breiby Hall Orthopædic Hosp.—Jun. Res. Asst. M.O., £350.
Derbyshire County Council.—Asst. County M.O.H., £700.
Derbyshire Royal Infirmary.—H.S. to Ear, Throat, and Nose Dept., £150.
Doncaster Royal Infirmary.—Fracture H.S., £200.
Dudley, Guest Hosp.—Two H.S.'s, £100–£130.
Ealing Borough.—Asst. M.O., £450.
Eastbourne Royal Eye Hosp.—H.S., £100.
Essex County Council.—Part-time Ophth. Surgeon, at rate of £200.
Evelina Hosp. for Sick Children, Southwark, S.E.—Fourth Physician, 50 guineas.
Gloucestershire County Council.—Two Asst. County M.O.H.'s, each £500.
Gt. Barrow, Barroumore Tuberculosis Sanatorium and Settlement. H.P., at rate of £150.
Guildford, Royal Surrey County Hosp.—H.S., and H.P. and Cas. O., each at rate of £150.
Hampstead General and North-West London Hosp., Haverstock Hill, N.W.—Res. Cas. M.O., at rate of £100.
Harefield, County Sanatorium.—Physician, £1000.
Hertford County Hosp.—H.P., at rate of £150.
Herifordshire General Hosp.—H.S., £100.
Hôpital et Dispensaire Français, 172, Shaftesbury-avenue, W.C.—Anæsthetist, £25.
Hosp. for Consumption, &c., Brompton, S.W.—Physician.
Hosp. of St. John and St. Elizabeth, 60, Grove End-road, N.W.—Asst. Phys.
Ilford, King George Hosp.—Res. Anæsthetist and H.P., at rate of £150.
Indian Medical Service.—Commissions.
Ipswich, East Suffolk and Ipswich Hosp.—H.P. and H.S. to Spec. Dept., &c., each £144.
Isleworth, West Middlesex County Hosp.—Anæsthetist and Asst. M.O., each £400.
Leamington Spa, Warneford General Hosp.—Res. H.P., at rate of £150.
Leeds Public Dispensary and Hosp.—H.P., at rate of £150.
Lincoln, Bracebridge Heath Hosp.—Second Asst. M.O., £475.
Liphook, King George's Sanatorium for Sailors.—Asst. M.O., at rate of £200.
Liverpool, County Mental Hosp., Rainhill.—Asst. M.O. Locum Tenens, 7 guineas per week.
London County Council.—Asst. M.O.'s, Grade I and II, £350 and £250 respectively.
London Jewish Hosp., Stepney Green, E.—Ear and Throat Registrar, 20 guineas.
Maidstone, West Kent General Hosp.—H.S., £175.
Manchester, Ancoats Hosp.—Cas. O., £175. Also H.S., at rate of £100.
Manchester, Park Hosp., Davyhulme.—Second Res. M.O., at rate of £300.
Manchester Royal Eye Hosp.—Jun. H.S., £120.
Manchester, St. Mary's Hosps.—H.S.'s to Spec. Depts., each at rate of £50.
Manchester and Salford Hosp. for Skin Diseases.—H.S., at rate of £150.
Middlesex County Council.—Sen. Obstet. Surgeon for Redhill County Hosp., £850. Tuberculosis M.O., £750. Also Obstet. Surgeon for North Middlesex County Hosp., £500.
Mount Vernon Hosp., Northwood.—H.S., £150.
National Temperance Hosp., Hampstead-road, N.W.—Res. M.O. and Cas. O., at rate of £175 and £120 respectively.
Nelson Hosp., Merton, S.W.—Res. H.S., at rate of £150.
Newark General Hosp.—Res. H.S., at rate of £175.
North Middlesex County Hosp., Edmonton.—Jun. Res. Asst. M.O., at rate of £250.
Norwich City.—Asst. M.O.H. and Asst. School M.O., £600.
Norwich, Jenny Lind Hosp. for Children.—Res. M.O., £120.
Oxford, Wingfield-Morris Orthopædic Hosp., Headington.—H.S., at rate of £100.
Pembroke County War Memorial Hosp.—Res. H.S., £200.
Plymouth, Prince of Wales's Hosp., Greenbank-road.—Asst. Pathologist, £500. Also H.S., at rate of £120.
Princess Beatrice Hosp., Earl's Court, S.W.—Cas. O. and Obstet. H.S., at rate of £120.
Princess Elizabeth of York Hosp. for Children, Shadwell, E.—H.P., at rate of £125.
Princess Louise Kensington Hosp. for Children, St. Quintin-avenue, W.—H.S., at rate of £120.
Queen Mary's Hosp. for the East End, E.—Clin. Asst. to Skin Dept.
Queen's Hosp. for Children, Hackney-road, E.—Asst. Physician.
Rochdale Infirmary and Dispensary.—H.P., £150.
Royal Army Medical Corps.—Commissions.
Royal Cancer Hosp., Fulham-road, S.W.—Second Asst. Pathologist, £250. Also H.S., at rate of £100.
Royal College of Surgeons of England.—Annual Examinerships. Also Examiner in Dental Surgery.
Royal Eye Hosp., St. George's-circus, S.E.—Research Assts.
Royal London Ophthalmic Hosp., City-road, E.C.—Two Out-patients' Officers, each £100.
Royal National Orthopædic Hosp., 234, Gt. Portland-street, W.—Two H.S.'s, each at rate of £150.
Royal Northern Hosp., Holloway, N.—H.S., at rate of £70.
Ryde, Royal Isle of Wight County Hosp.—Jun. H.S., £120.
St. John's Hosp., Lewisham, S.E.—Hon. Physician to Children's Dept.
St. Mary's Hosp., Institute of Pathology and Research, W.—Research Studentship, at rate of £200.
St. Peter's Hosp. for Stone, &c., Henrietta-street, W.C.—H.S., at rate of £75.
Salford Royal Hosp.—H.P., three H.S.'s, and Cas. H.S., each at rate of £125.
Seaton Valley Urban District Council, &c.—M.O.H., &c., £1100.
Sheffield Children's Hosp.—H.S., at rate of £100.
Sheffield, Winter-street Hosp.—Asst. Tuber. O., £350.
Shoreham-by-Sea, near Brighton, Southlands Hosp.—Res. Asst. M.O., £300.

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South London Hosp. for Women, Clapham Common, S.W.—H.P., at rate of £100. Also Clin Assts.
Southampton, Free Eye Hosp.—H.S., £150.
Staffordshire General Infirmary.—Hon. Visiting Surgeon.
Stockport, Stepping Hill Hosp.—Res. Asst. M.O., £350.
Stoke-on-Trent, Stanfield Sanatorium.—Res. M.O., £350.
Sudan Medical Service.—Medical Inspector, £E720.
Surrey County Council.—Asst. M.O., £600.
Taunton and Somerset Hosp.—H.S., £125.
Walsall Manor Hosp.—Res. Asst. M.O., £350. Jun. Asst. M.O., £150. Also Con. Obstetrician and Gynæcologist, 3 guineas per session.
Warrington Infirmary and Dispensary.—Third Resident, at rate of £150.
West Bromwich, Hallam Hosp.—H.S., at rate of £200.
West London Hosp., Hammersmith, W.—H.P. and H.S., each at rate of £100.
West Riding of Yorkshire County Council.—Asst. County M.O., £960.
Western Ophthalmic Hosp., Marylebone-road, N.W.—Sen. H.S. and Jun. H.S., £150 and £100 respectively.
Willesden General Hosp., Harlesden-road, N.W.—Res. Officer, at rate of £100.
Worksop Victoria Hosp.—Jun. Res., £125.
Wrexham and East Denbighshire War Memorial Hosp.—Two Res. H.S.'s, each at rate of £150.
York County Hosp.—H.S., £150.

The Chief Inspector of Factories announces a vacancy for a Certifying Factory Surgeon at Tintern (Monmouth).

Medical Referee under the Workmen's Compensation Act, 1925, for the Selkirk Sheriff Court District (Sheriffdom of Roxburgh, Berwick, and Selkirk). Applications should be addressed to the Private Secretary, Scottish Office, Whitehall, London, S.W.1, before March 18th.

Medical Referee under the Workmen's Compensation Act, 1925, for the Dartford; and Gravesend (Circuit No. 56) and Grays Thurrock; and Southend (Circuit No. 58) County Court Districts. Applications should be addressed to the Private Secretary, Home Office, Whitehall, London, S.W.1, before March 24th.

Medical Diary

March 7th to March 12th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY.

Therapeutics and Pharmacology. 5 P.M., Dr. W. W. Payne: Vegetable Proteins in the Treatment of Diabetes. Dr. R. D. Lawrence and Dr. R. S. Aitken: Zinc Protamine Insulin.

Psychiatry. 5.30 P.M., clinical meeting at the Maudsley Hospital, Denmark-hill, S.E.

WEDNESDAY.

Surgery: Subsection of Proctology. 8.30 P.M., Mr. T. F. Todd: Rectal Ulceration following Irradiation Treatment. Mr. Cecil Joll: Excision of the Colon for Carcinoma. Mr. A. Hedley Whyte: Post-anal, so-called Pilonidal, Sinus. Mr. W. B. Gabriel: An Adaptable Light for Proctoscopy. Mr. A. Lawrence Abel: Abdomino-perineal Excision and Partial Colectomy (Films).

FRIDAY.

Ophthalmology. 8.30 P.M. (Cases at 8 P.M.), Mr. Eugene Wolff: Hexagonal (Polygonal) Figures formed by the Outer Portions of the Rods and Cones. Can the Network formed by the Pigment of the Retinal Pigment Epithelium be seen with the Ophthalmoscope? Mr. E. B. Alabaster: The Use of Wire Splints in Operations for Convergent Strabismus.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.

MONDAY.—9 P.M., Dr. George Graham: A Survey of the Changes and Results of Treatment of Diabetes in the Last 15 Years. (Last Lettsomian lecture.)

HARVEIAN SOCIETY OF LONDON.

THURSDAY.—8.30 P.M. (26, Portland-place, W.), Sir Arthur Hurst: Physical Basis of "Biliousness," "Wind Round the Heart," and some other Popular Maladies. (Harveian lecture.)

LONDON JEWISH HOSPITAL MEDICAL SOCIETY, Stepney Green, E.

THURSDAY.—3.15 P.M., Dr. H. B. Morgan, Dr. D. C. Norris, and Mr. J. L. Smyth: Industrial Disease.

SOUTH-WEST LONDON MEDICAL SOCIETY.

WEDNESDAY.—9 P.M. (Bolingbroke Hospital, Wandsworth Common, S.W.), Dr. F. M. Allchin: The Present Position of Radiotherapy.

PADDINGTON MEDICAL SOCIETY.

TUESDAY.—9 P.M. (Tuberculosis Dispensary, 20, Talbot-road, W.), Mr. A. Simpson-Smith: Pre- and Post-operative Treatment of Surgical Cases.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.

FRIDAY.—8.45 P.M. (Miller General Hospital, Greenwich, S.E.), Mr. H. E. Griffiths: Incapacity for Work following Fractures.

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY.

THURSDAY.—8.15 P.M. (11, Chandos-street, W.), Prof. John Macmurray: A Philosopher's View of Modern Psychology.

BIOCHEMICAL SOCIETY.

FRIDAY.—2.30 P.M. (University College, Gower-street, W.C.), annual general meeting. Short communications and demonstration.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.

TUESDAY and THURSDAY.—5 P.M., Dr. C. C. Ungley: Some Deficiencies of Nutrition and their Relation to Disease. (Goulstonian lectures.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.

MONDAY.—5 P.M., Dr. L. W. Proger: Demonstration of New Museum Specimens.

FRIDAY.—5 P.M., Dr. A. J. E. Cave: Anatomy of the Diaphragm.

UNIVERSITY OF GLASGOW.

TUESDAY.—4.30 P.M. (Tennent Memorial Building, Church street), Prof. A. J. Ballantyne: Diseases of the Iris, Ciliary Body, and Choroid.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE 28, Portland-place, W.

WEDNESDAY.—3.30 P.M., Dr. Clifford Hoyle: The Prevention of Minor Ailments.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.

TUESDAY.—5 P.M., Prof. J. H. Gaddum, Sc.D.: Ephedrine. (Sydney Ringer lecture.)

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.

WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Dr. J. G. Scadding: Respiratory Function in Disease (2). 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Dr. Dorothy Russell: Tumours of the Central Nervous System and Meninges.

THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration. 2.30 P.M., Mr. L. R. Broster: Surgical Application of Endocrinology with Special Reference to the Adrenal Glands. 3.30 P.M., Mr. Malcolm Donaldson: Dysmenorrhœa. 4.30 P.M., Mr. Kenneth Walker: Venereal Diseases.

FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. Geoffrey Keynes: Diseases of the Breast.

Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

NATIONAL HOSPITAL, Queen-square, W.C.

MONDAY.—3.30 P.M., Dr. C. P. Symonds: Cerebral Tumours (2).

TUESDAY.—3.30 P.M., Dr. F. M. R. Walshe: Diseases of Extrapyramidal Motor System.

WEDNESDAY.—3.30 P.M., Dr. Walshe: clinical demonstration.

THURSDAY.—3.30 P.M., Mr. Geoffrey Jefferson: Head Injuries.

FRIDAY.—3.30 P.M., Dr. E. A. Carmichael: Syringomyelia.

Out-patient clinic daily at 2 P.M.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY.—2 P.M., Dr. E. A. Cockayne: Meningitis in Infancy. 3 P.M., Mr. J. H. Doggart: Causes of Nystagmus in Infants and Young Children.

Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W.

TUESDAY.—5.30 P.M., Dr. D. Evan Bedford: Auscultation.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL, N.W.

WEDNESDAY.—4 P.M., Mr. H. Lawson Whale: Influenza and the Upper Air-passages.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

FRIDAY.—4 P.M., Mr. N. Asherson: Affections of the Lingual Tonsil.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY to SATURDAY.—ROYAL WATERLOO HOSPITAL, Waterloo-road, S.E., all-day course in medicine, surgery, and gynæcology.—F.R.C.S. (PRIMARY) COURSE IN PHYSIOLOGY, Mon., Wed., and Fri., at 5.30 P.M.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W., Tues. and Thurs., at 8 P.M., M.R.C.P. clinical and pathological course.—ST. MARK'S HOSPITAL, City-road, E.C., all-day course in proctology.—BROMPTON HOSPITAL, S.W., 5 P.M. twice weekly, M.R.C.P. course in chest diseases.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, S.W.

WEDNESDAY.—4 P.M., Mr. E. G. Muir: Some Minor Disorders of the Rectum.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.

FRIDAY.—4.30 P.M., Mr. A. G. Timbrell Fisher: Physical Medicine and Orthopædic Surgery (1).

INSTITUTE OF CHILD PSYCHOLOGY.

MONDAY.—6.15 P.M. (Friends House, Euston-road, N.W.), Dr. Ethel Dukes: The Successful Wife. 8.15 P.M., Dr. M. Bevan-Brown: Adequate Parenthood.

MANCHESTER ROYAL INFIRMARY.

FRIDAY.—4.15 P.M., Mr. A. H. Southam: clinical demonstration.

ANCOATS HOSPITAL, Manchester.

THURSDAY.—4.15 P.M., Mr. E. E. Hughes: Renal Hæmorrhage.

LEEDS GENERAL INFIRMARY.

TUESDAY.—3.30 P.M., Dr. F. F. Hellier: The Value of X Ray Treatment in Dermatology.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.

WEDNESDAY.—4.15 P.M. (Victoria Infirmary), Dr. W. Herbert Brown: Skin Diseases.

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NOTES, COMMENTS, AND ABSTRACTS

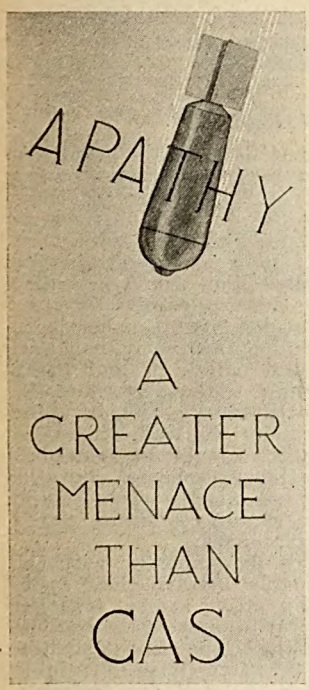
AIR-RAID PRECAUTIONS IN A MENTAL HOSPITAL

By Allen C. Hancock, M.C., M.B. Lond., D.P.H., D.P.M.
MEDICAL SUPERINTENDENT OF THE KENT COUNTY MENTAL HOSPITAL, MAIDSTONE; AND
T. R. Forsythe, M.B. Sheff., D.P.M.
DEPUTY MEDICAL SUPERINTENDENT OF THE HOSPITAL

The mental hospital at Barming Heath, Maidstone, occupies a prominent position half-way between London and the Coast; two railways lie in the vicinity; it is bounded on three sides by important roads and is within a few miles of a famous dockyard. There are approximately 2500 residents.

Early in 1935 it occurred to us that we ought to decide what steps could be taken to protect the personnel in the event of an air-raid on the district. Protective measures seemed increasingly necessary as we watched the progress of general rearmament and the gathering war-clouds in various parts of the world, and we were particularly impressed by the accounts of advanced methods of aerial warfare. We learned, for instance, that five aeroplanes employing the "high spray" method could intensely contaminate the whole area of the Maidstone Mental Hospital with liquid mustard in almost as many seconds. We therefore made a survey of personnel and material at our disposal and discussed our position with the commanding officer of the local depôt, who held an inaugural demonstration in the use of the respirator and later lent us about fifty of these so that we could commence to train our squads.

FIG. 1



Our next step was to consider the lay-out of the hospital from its highest point and from a large-scale map, and we decided to divide it into several strategic areas with a site for a sub-headquarters for each and a central headquarters to control all. We allotted to each sub-headquarters a sick ward that could be used for the treatment of casualties, and one for decontamination. It was found comparatively simple to draw up plans for the conversion of some of the existing bathing establishments for the latter purpose. It was arranged that the sub-headquarters should be in charge of a competent official who would have under his authority a number of squads for various purposes, together with some reserves. The squads would be provided with all the essential equipment for their special duties. Handcarts or other available vehicles would be necessary for the transport of heavy tools and other materials to the place where their presence would be required. Telephonic communication with central headquarters and with the other sub-headquarters would be essential, whilst runners with bicycles would be necessary against the event of a breakdown of the telephone service. The fire station would be manned

FIG. 2

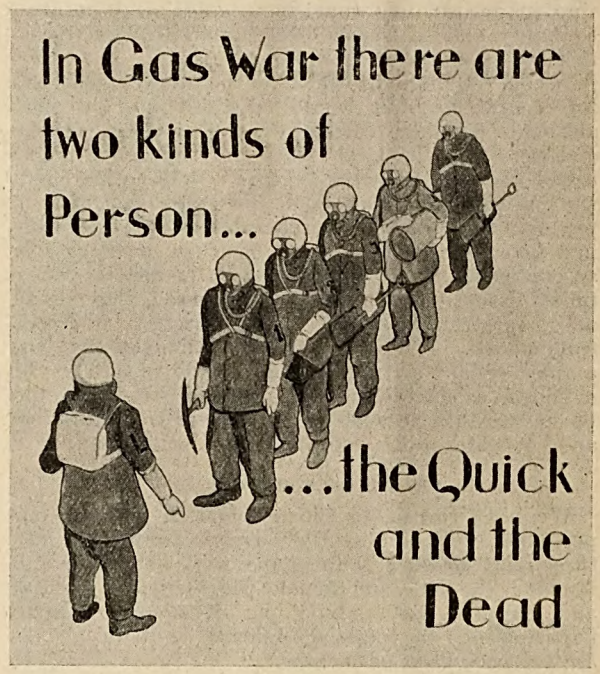
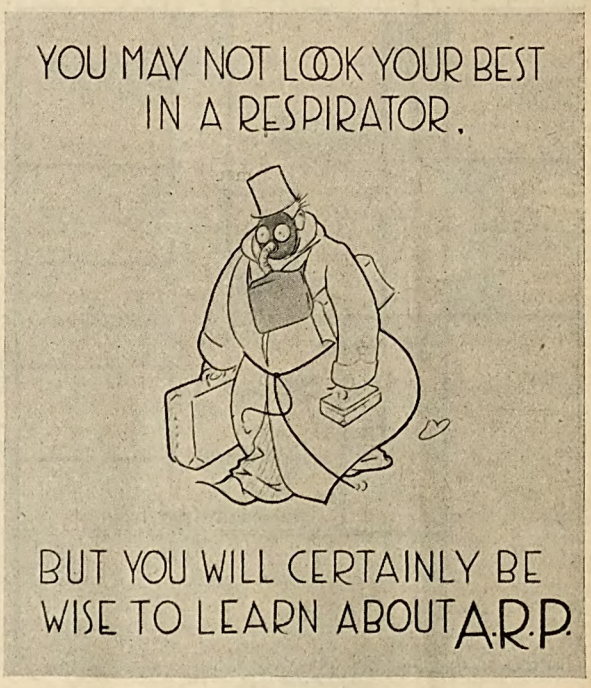


FIG. 3



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by the appropriate squad, whose numbers would be augmented in case of casualties, whilst the engineer's department would be the obvious habitat of the demolition squad. Posts were then selected for wardens whose duty would be to guide stray patients to safety and to ensure decontamination and treatment of casualties if these should arise.

In our opinion, provision of bomb-proof shelters for mental hospitals would be quite impracticable, although possibly, certain of the essential service stations—the electrical plant for instance—might need some form of reinforcement. On the other hand, the patients and staff could be instructed how to render certain rooms gas-proof, preferably those on the first floor, so that they could use them as refuges in an emergency. Covered ways could be utilised to the fullest extent since, being tiled or glazed, they would afford protection against liquid mustard liberated from above. It was at one time thought that the ample cellar accommodation could usefully be employed as shelter, but we concluded that this would be undesirable because of the danger from furnaces and hot-water pipes, and inadequate ventilation.

TRAINING OF PERSONNEL

We next turned to the problem of training our personnel, and divided the hospital population into three main classes: (1) available *staff*, both male and female; (2) male and female *patients* whose mental and physical state would permit of their useful participation in passive defence measures; (3) *helpless patients* of both sexes.

(1) In the event of war the male staff would rapidly diminish—particularly the younger ones who would be called to the colours—so they could not be counted as assets in the present scheme, although they would be invaluable for training purposes, especially as many of them are reservists, and not a few have actually been on active service. The older men would, however, have a more certain rôle to fill. The female nurses would have their time fully occupied by indoor activities, including dressing casualties,

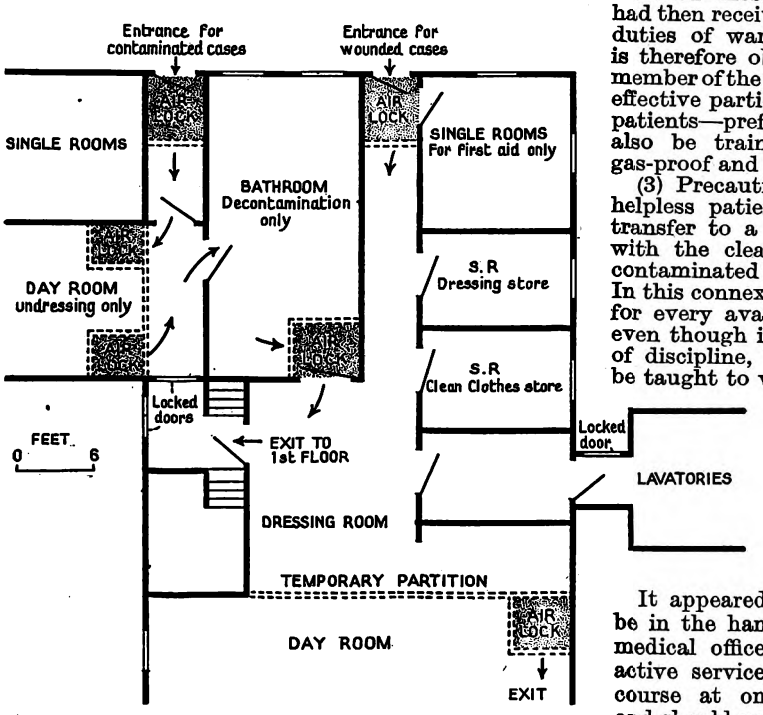

FIG. 5.—Scheme for adapting present quarters for emergency use.

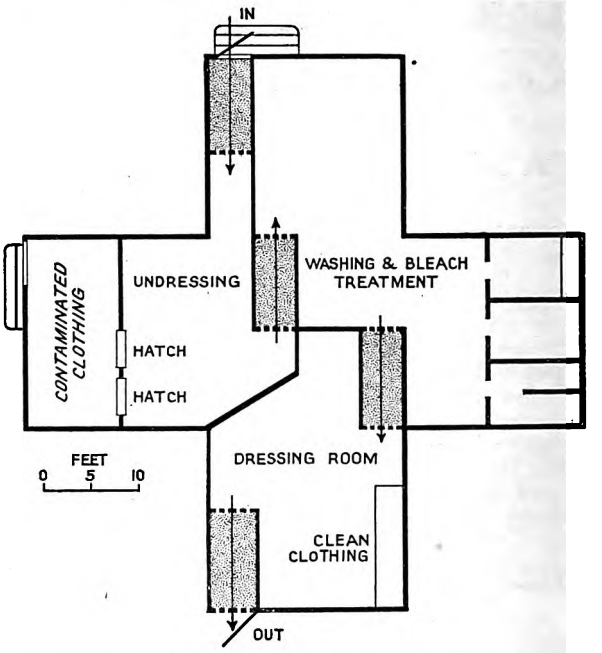

FIG. 4.—Scheme for adapting female occupation room as a decontamination centre.

shepherding patients to places of safety, and supervising their well-being.

(2) In normal times a great deal of the hospital's routine work is carried out by patients who, owing either to long residence or to the nature of their illness, require few restrictions on their movements and little observation. Experience has shown that such persons take a very intelligent interest in the march of events, and if called upon would probably prove to be a very valuable asset in passive defence. At a recent air-raid precaution demonstration held here a large number of male patients took an active part and behaved most efficiently and calmly though they had then received little training. They performed the duties of wardens very satisfactorily. Their value is therefore obvious, and, under the leadership of a member of the staff, they could reasonably be counted as effective participants in the general scheme. Suitable patients—preferably the usual ward-workers—could also be trained in the work of rendering wards gas-proof and in assisting the nurses.

(3) Precautionary methods in connexion with the helpless patients would merely involve their rapid transfer to a place of comparative safety, together with the cleansing of any who may have become contaminated whilst proceeding to the place of shelter. In this connexion we think that some form of training for every available person is undoubtedly desirable, even though it merely consists in teaching the value of discipline, but wherever possible patients should be taught to wear respirators and to appreciate their protective value. The degree of success in this part of the scheme would depend to a great extent on the demeanour and resolution of the nurses. Contrary to popular belief, however, panic is perhaps less probable among the mentally sick than among members of the general civilian population.

It appeared essential that the organisation should be in the hands of some senior official, preferably a medical officer. Besides having had experience on active service, he should have recently attended a course at one of the recognised anti-gas schools and should possess an instructor's certificate.

As we considered that coöperation with the local

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authority was desirable, liaison was established with the county A.R.P. officer who has given us the benefit of his experience and special knowledge continuously since our scheme came into being. It had to be borne in mind, however, that a mental hospital is largely a self-governing and self-organised unit which is always best served by those who understand the patients and are thoroughly familiar with the working of the place.

Posters of a striking nature were exhibited in the hospital and helped to stimulate the growing interest in the scheme (Figs. 1–3).

Lectures to a class consisting of all heads of departments and senior officials paved the way to encouraging interest among the lower ranks of the establishment. These lectures were given at regular intervals and were as follows :—

LECTURE I—*Nature of Chemical Warfare*
Statistics from the Great War.
Historical survey from 404 B.C. to modern times.
Types of chemicals used.
Salt and coal derivatives.
Elementary chemistry and physics of the war chemicals.
Their general properties and effects.

II—*Mustard Gas in Detail*
Individual protection—the chemical respirator.
Weapons by which gas may be used—e.g., the projectile, bomb, and spray.

III—*Organisation of a General Defence Scheme*
Decontamination, demolition, and fire.

IV—*Collective Protection*
The passive and active population.
The decontamination squad.
Their duties in detail.

V—*Decontamination—its Significance*
Types of contamination.
Effects of the elements.
General principles of decontamination.
Details of methods employed in decontaminating various surfaces and materials.

VI—*Bodily Injuries from Chemical Poisons and Appropriate First-aid Measures*
(*a*) Lacrymatory gases ; (*b*) asphyxiating and choking gases ; (*c*) vesicants ; (*d*) accidental gases.
Casualty organisation.

The demonstration models were made by selected patients in the occupational therapy rooms. The plans of these were drawn up previously by the hospital A.R.P. officer (T. R. F.).

Respirator drill was included in the general instructional course. Respirators were not available in any quantity at that time and the local garrison helped us to solve the difficulty. Later, when the scheme had been approved by the A.R.P. department of the Home Office, an issue not only of respirators but also of protective clothing for the Institution resulted.

When initial interest had been created, the next step was to disseminate the doctrine of "gas-mindedness" among the remainder of the population. We found it advantageous to emphasise to each individual that in the event of an air-raid he or she would have a most important duty to carry out, and that in no circumstances would their personal efforts be regarded as trivial.

Practical work is now following hard upon the heels of theory, for efficiency without confusion will be the true test. Squads are already formed and trained in first aid, decontamination, demolition, and fires, particularly those arising from incendiary bombs. Further developments will follow in the course of time with the gradual absorption of more and more patients into the scheme.

A point of practical importance is the method of giving the gas alarm. This should be distinctive from the fire alarm and also should not be easily confused with motor horns. We have found that striking shell-cases or suspended steel bars is distinctive and efficient. Alarms were placed at frequent intervals in the hospital and grounds and were operated by gas sentries, who were male patients suitably clothed and trained.

We are fortunate in that almost all parts of the hospital may be reached under cover. The sites chosen for the treatment of casualties are ordinary sick wards which would require little alteration to fulfil their emergency function, whilst Figs. 4 and 5 suggest a means of improvising first-aid decontamination centres from existing buildings. We have a large-scale map showing roads and alternative routes and positions of the fire hydrants, since they must be known to the decontamination squads as well as to the fire parties.

The magnitude of the problem is now coming to be appreciated by all members of the staff and by many patients. The squads have been tested in action and under control of central headquarters at which Home Office experts were present in an advisory capacity.

A small building, specially designed, is in course of construction and will ultimately be used as a gas store.

In addition to the general progress of instruction, experiments are to be carried out to ascertain the effect of the respirator upon patients suffering from various cardiac, pulmonary, and other diseases. Further, in the immediate future the number of active squads will be increased and the general field of operations widened.

We hope that this account of our organisation may be of some assistance to the administrators of other institutions who are embarking on protective schemes.

NEW PREPARATIONS

"FERRÆMIA" BRAND TABLETS, made by Wilcox, Jozeau and Co. Ltd. (North Circular-road, London, N.W.2), are intended for use wherever treatment with iron is needed. Each tablet is stated to contain ferrous sulph. exsicc. 2¼ grains, dried yeast gr. 2, copper sulphate gr. 1/100, and manganese hypophosph. gr. 1/32, with an excipient and a chocolate coating. Soluble ferrous salts of iron are readily assimilated, and the small doses required "do not constipate, cause gastric upset or produce any other undesirable sequelæ."

SEVENSEAS COD LIVER OIL is prepared by British Cod Liver Oil Producers (Hull) Ltd., of St. Andrew's Dock, Hull, in "the world's largest and most efficient cod-liver oil refinery." The advantages claimed are that it has no trace of the usual objectionable taste and smell and that "every delivery is standardised both as regards general character and vitamin potency." Besides their Standard oil, which complies with the British Pharmacopœia standard as regards vitamins A and D, the company sell SevenSeaS High Potency Oil (in bottles or capsules) which has a minimum strength four times the B.P. standard. It is guaranteed to be a pure cod-liver oil to which nothing has been added, and "the protective dose is five drops only."

AMPOULES "RETICULOGEN."—This preparation is primarily designed for intramuscular injection in pernicious anæmia. Each 0·5 c.cm. ampoule is said to contain the hæmopoietic equivalent of between 3 and 4·5 kg. of fresh liver, together with 500 international units of vitamin B_1, which it is thought may prevent nervous lesions. The ordinary maintenance dose suggested is one ampoule once a week or once a fortnight. The distributors are Eli Lilly and Company, Ltd., 2, Dean-street, W.1.

CAAPI ANTI-CORYZA TABLETS contain several remedies regarded as useful in colds and respiratory catarrhs. H. R. Napp Ltd. (3, Clements-inn, W.C.2), the manufacturers, give the formula as atropine

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sulphate 1/180 grain, caffeine gr. 1, phenacetin gr. 2, quinine alkaloid gr. ¼, and cinnamon pulvis gr. 1.

"DESITIN" BRAND OINTMENT is a cod-liver oil preparation which is said to keep indefinitely. A thin layer spread over the skin does not liquefy with the heat of the body and forms a bland covering that favours healing and epithelialisation of burns, ulcers, and wounds with large surfaces. The ointment is also recommended for the treatment of a variety of skin diseases, including eczema, herpes, and seborrhœa. It is composed of cod-liver oil 15 parts, zinc oxide 38, talc 4, lanolin 10, and a soft paraffin 33. It is sold by Desitin Products Ltd., N.W.10.

FROM C. R. HARKER, STAGG AND MORGAN LTD. (Emmott-street, E.1) we have received an elaborate brochure describing the use of Unguentolan, a cod-liver oil ointment made by Heyl and Co., of Berlin, at the direction of Prof. W. Löhr of Magdeburg, who introduced the local use of cod-liver oil for burns six years ago (see *Lancet*, 1934, 2, 367). Besides 67 photographs this brochure contains full summaries of 32 papers on the subject, and should be valuable to anyone requiring information about the method.

A new booklet on Streptocide (sulphanilamide Evans) reaches us from EVANS SONS LESCHER AND WEBB (Liverpool and London) who now issue this remedy in folded powders as well as tablets. They also send an account of diphtheria immunisation with Alum Precipitated Toxoid and Toxoid Antitoxin Floccules. The A.P.T. is now more concentrated than formerly and two doses are definitely advised.

In a new booklet produced by the MARMITE FOOD EXTRACT CO. LTD. (Walsingham House, Seething-lane, E.C.3), attention is directed to the advantages of this autolysed extract of fresh brewers' yeast as a rich source of the vitamin-B complex, as an anti-anæmic agent, and as a prophylactic and therapeutic agent in tropical medicine. New evidence of the nutritional value of Marmite in pregnancy is quoted from the accounts by Dr. Margaret Balfour, Dr. G. C. M. M'Gonigle, and others of the spectacular fall in the mortality-rate which has followed the supplementary feeding of expectant mothers in certain of the depressed areas.

JOINT TUBERCULOSIS COUNCIL

THE meeting of this council on Feb. 19th marked the end of the long secretaryship of 14 years of Dr. Ernest Ward, the originator of the council.

The officers for 1938 are: chairman, Dr. S. Vere Pearson (Mundesley); vice-chairmen, Dr. G. Lissant Cox (Lancashire) and Dr. D. A. Powell (Cardiff); secretary, Dr. J. B. McDougall (Preston Hall, Kent); treasurer, Dr. G. Jessel (Lancashire); auditor, Dr. D. P. Sutherland (Manchester). The council decided to publish the exhaustive report on sputum examination prepared by its committee. The Ministry of Health had replied to a communication to the effect that in classifying patients who showed tubercle bacilli in discharges from glands, bones, and joints, "T.B. plus" or "T.B. minus" related only to those suffering from pulmonary tuberculosis, and not to those with tubercle bacilli in other discharges. The view was expressed that as many medical associations as possible interested in tuberculosis should have official representation on the council. Dr. Ward, in his biennial report, paid special attention to the microscopical examination of sputum, culture of tubercle bacilli, examination of contacts, results of artificial pneumothorax treatment, tuberculosis amongst nurses, milk, tuberculin, and sedimentation. The treasurer's report emphasised the need for additional sales of the council's publications. The statement for the year 1937 showed a credit balance of £53 16*s.* 9*d.* The expansion of the work of the council, however, had necessitated greater demands on its financial resources, and a finance and publicity committee has been set up. A memorandum was presented for submission to the interdepartmental committee on nursing services. It gave a comprehensive account of the problems in relation to tuberculosis institutions in this country, including the inauguration of a supplementary register, hours of duty, definition of "assistant nurses," factors influencing recruitment, employment of tuberculous ex-patients as nurses, and suggestions for improved remuneration and conditions of service. The radiological interpretation committee had been successful in coöpting representatives of the radiological societies in this country, and a comprehensive report will be available in due course.

The next meeting of the council is to be held on May 21st.

Appointments

GARLAND, H. G., M.D. Leeds., M.R.C.P., Hon. Neurologist to the Leeds Jewish Herzl Moser Hospital.

HOYLE, CLIFFORD, M.D., M.R.C.P. Lond., Assistant Physician to King's College Hospital, London.

KIERNANDER, F. B., M.B., M.R.C.P. Lond., Assistant Radio-therapist at University College Hospital, London.

LISHMAN, F. J. G., M.D. Lond., D.P.H., D.L.O., Deputy Medical Officer of Health for Gloucestershire.

MACKENZIE, N.F., M.B. Edin., D.P.M., Deputy Superintendent at the Brockhall Certified Institution for Mental Defectives, Langho, near Blackburn.

MORGAN, J. G., M.B. Lond., D.P.H., Medical Officer of Health for Pontardawe rural district.

*SKLARZ, ERNST, M.D. Breslau, L.R.C.P. Edin., Lecturer in Dermatological Pathology at the Hospital for Diseases of the Skin, Blackfriars.

TAYLOR, R. G., M.B. Dubl., F.R.C.S. Eng., Clinical Assistant in the Orthopædic Department of the Royal Infirmary Sheffield.

TENNENT, THOMAS, M.D. Glasg., M.R.C.P. Lond., D.P.H., D.P.M., Medical Superintendent at St. Andrew's Hospital, Northampton.

THOROLD, G. P., B.M. Oxon., Medical Registrar at the St. John Clinic and Institute of Physical Medicine, London.

UNGER, W. F. M., M.D. Berlin, L.R.C.P. Edin., Assistant Medical Officer in the Out-patient Department of the Royal Manchester Children's Hospital.

YORKE, H. E., L.M.S.S.A., Chief Assistant in the X Ray Department of St. Bartholomew's Hospital.

Certifying Surgeons under the Factory and Workshop Acts: Dr. C. F. LEONARD (Brixworth District, Northampton); Dr. A. BOYLE (New Mills District, Derby); Dr. E. B. BARTON (Silloth District, Cumberland); Dr. W. H. DUNN (Solihull District, Warwick); Dr. T. DUNLOP (Tilbury District, Essex); Dr. H. FOWLIE (Appleby District, Westmorland); Dr. G. ABBEY (Tutbury District, Stafford); Dr. D. A. SMITH (Newcastle District, Northumberland); Dr. A. S. KITCHEN (Colmonell District, Ayr); Dr. D. MACKIE, M.C. (Glenorchy and Inishail Distr'ct, Argyll); Dr. W. D. MCLELLAN (Strachur District, Argyll); Dr. W. B. RUSSELL (Ballantrae District, Ayr); Dr. A. CAMERON (Saddell-and-Skipness District, Argyll); Dr. D. MACQUEEN (Killean and Kilkenzie District, Argyll); Dr. J. MACINTYRE (Lochgoilhead and Kilmorich District, Argyll); Dr. R. A. M. DAVIDSON (Dunscore and Glencairn District, Dumfries).

* Dr. Sklarz's name and qualifications were incorrectly given in our issue of Feb. 5th.

Births, Marriages, and Deaths

BIRTHS

ADDISON.—On Feb. 22nd, at Nuffield House, S.E., the wife of Dr. George Addison—a daughter.

EVANS.—On Feb. 26th, 1938, at Chelford, Cheshire, the wife of Dr. Ernest Sandford Evans—a son.

MARRIAGES

NICHOLSON—BURDON-COOPER.—On Feb. 19th, at St. Columba's, Pont-street, Bernard Clive Nicholson, M.D., M.R.C.P., to Frances Rose, younger daughter of Dr. Burdon-Cooper, of Bath.

DEATHS

DAKIN.—On Feb. 26th, at Colsterworth, Thomas Burns Dakin, M.R.C.S. Eng, aged 67.

DREW.—On Feb. 27th, at Weston-super-Mare, John Harmer Drew, M.D. Lond., aged 56 years.

GANN.—On Feb. 24th, in London, Thomas Gann, M.R.C.S. Eng., D.T.M. Liverp., late P.M.O., British Honduras.

FITZMAURICE.—On Feb. 25th, in India, James Francis Fitzmaurice, L.R.C.P.I., late chief medical officer, Kolar Gold Field.

GILBERTSON.—On Feb. 22nd, at Hitchin, James Henry Gilbertson M.R.C.S. Eng, aged 77.

MEADE-KING.—On Feb. 25th, at Taunton, Richard Liddon Meade-King, M.D. Durh., aged 68.

MITCHELL.—On Feb. 22nd, at Templemore, Co. Tipperary, Gerald Mitchell, M.D., M.Ch. R.U.I.

ROUGHTON.—On Feb. 27th, suddenly during Mediterranean cruise, John Paul Roughton, J.P., M.R.C.S. Eng., of Cambridge, formerly of Kettering, and late Assistant Electrician, St. Bartholomew's Hospital.

SLATTER.—On Feb. 21st, Oliver Thomas Slatter, M.R.C.S. Eng., late of Rothley, Leicester, in his 85th year.

WALKER.—On Feb. 27th, John Frederick Walker, M.B. Lond., J.P., of Southend-on-Sea.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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ADDRESSES AND ORIGINAL ARTICLES

THE PUBLIC HEALTH ASPECT OF HEART DISEASE IN CHILDHOOD*

By Bernard Schlesinger, M.A., M.D. Camb., F.R.C.P. Lond.

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I

A review of the social aspect of heart disease in childhood is particularly apposite at a moment when the health of the nation, especially of its younger members, is so much in the public eye. My observations have been confined to acquired cardiac disease, and in childhood this virtually means rheumatic carditis, since syphilis, arterio-sclerosis, and degenerative conditions are negligible in early life.

The high incidence of juvenile rheumatism in this country—especially in its large, over-populated cities—has been so well established that it is unnecessary for me to give figures. It is striking how many writers introduce the subject with a gloomy reference to the mortality. This has tended to bias the reader's mind unfavourably and, while rightly emphasising the dangers of the disease, it has given juvenile rheumatism a blacker reputation than it deserves. To approach the social aspect in a pessimistic attitude is almost to accept defeat at once.

America was one of the first countries to take practical steps to combat the disease in childhood, although some of the more recent writers from that country question the ultimate value of the various costly measures undertaken (Cahan 1929, Stroud 1933, and others). In England an optimistic attitude prevails, with the result that arrangements for treatment and supervision of juvenile rheumatism, so warmly advocated by Poynton and inaugurated in London by Sir George Newman, are now becoming available in other parts of the kingdom. The scheme in London, provided by the county council and the Board of Education, is certainly more complete than that of any other city in the world. It has been extended in recent years and is now estimated to cost just over £220,000 annually.

In these lectures I want to review the existing system, examine its shortcomings, and discuss its possible improvement. Above all I should like to show the immense value of the work and to demonstrate how with proper care and supervision the average child with a damaged heart may develop into a tolerably healthy adult and a useful member of the community.

Whilst in charge of a country convalescent heart hospital for children at West Wickham, administered by the Invalid Children's Aid Association, I have had an opportunity of examining over a 1000 cases and following them personally for varying periods during the last ten years, many of them through adolescence into adult life. Only 57 old patients remain untraced—a proportion too small to influence the conclusions.† This hospital admits girls up to sixteen years and boys up to eight, so that the series contains many more females than males. Apart from the fact that mitral stenosis is more common in women, I am not aware of any influence of sex on the ultimate prognosis of heart disease. The deleterious effect of pregnancy in women is about matched by the harmful influence on a damaged heart of some of the more arduous forms of manual employment that are open to men. The uneven balance in regard to sex in the present series is therefore of no material consequence.

Before embarking on a detailed analysis of the prognosis of juvenile rheumatism it is important to define the standards adopted in the diagnosis of heart disease. The attempt to recognise the very earliest signs of cardiac involvement and prevent further damage leads to many children being sent to convalescent heart hospitals unjustifiably labelled as cardiac cases; there have been about 200 instances of this at West Wickham during the last ten years. A presumptive diagnosis of mitral stenosis is almost as common. Congenital malformation, again, is not always easy to distinguish from acquired disease. In about 30 cases admitted to West Wickham this error has been disclosed by careful attention to the physical signs, the absence of a rheumatic history, and the discovery of an abnormal heart early in infancy. They have been excluded from the series under consideration.

PHYSICAL SIGNS: SIGNIFICANCE OF MURMURS

Cardiology in children cannot be approached in quite the same way as in adults, for at an age when heart disease is developing, symptoms are usually less pronounced and physical signs of much greater significance. The ability to detect any degree of cardiac enlargement by simple clinical means is certainly a help. Often, however, well-marked heart disease may be present without any material enlargement at the time of examination, and the physician, therefore, has to rely more on auscultation. This raises the vexed question of *systolic murmurs* heard over the mitral area.

I am well aware that the diagnosis of *mitral regurgitation* in adults is no longer so popular as it was and that systolic murmurs have lost a good deal of their clinical significance (Mackenzie 1925, Lewis 1933). This may be true of adults, but in a rheumatic child the discovery of this murmur is a matter of some concern, particularly if it has not been heard previously. To wait for signs of mitral stenosis or evidence of cardiac enlargement before giving appropriate treatment is to delay too long. Experience has shown that the first rheumatic onslaught giving rise to a systolic murmur may only be a stage in the development of serious myocarditis or of progressive mitral stenosis. Fortunately only a proportion of the cases run this downhill course; a fair number remain stationary and quite a few recover completely. In the group of rheumatic cases about to be analysed therefore, a constant apical systolic murmur has been taken as a-priori evidence of damage in the region of the mitral orifice, probably with valvulitis, and as an indication for investigation and treatment. Cardio-respiratory, hæmic, and exocardial murmurs have naturally been excluded as far as possible. Recumbency has been the standard posture during examination, the effect of exercise has been noted, and systolic basal murmurs have always been disregarded.

There has never been any argument about *diastolic apical murmurs;* they have always been accepted

* The Milroy lectures for 1938, delivered before the Royal College of Physicians of London on Feb. 24th and March 1st. Lecture II will appear in a later issue of THE LANCET.

† The 57 cases have not been included in the 1000 cases detailed in Table I.

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as evidence of organic disease and usually as an indication of early mitral stenosis. It is well established that a long rumbling diastolic apical murmur or a loud "crescendo" presystolic murmur is clear evidence of well-*developed* mitral stenosis. Whether in other cases a short or less distinct diastolic or presystolic bruit, sometimes only discovered after exercise, can always be taken as a certain sign of *early* mitral stenosis is not so clear. It is true that with a progressive lesion the diastolic murmur gradually becomes more obvious. In others the early signs never change, in which case the heart has probably quite recovered from its original inflammation except for a slight non-progressive narrowing of the mitral orifice. These are accepted facts, but it is perhaps not generally known that similar diastolic murmurs may be heard for a considerable time in a rheumatic child and may then disappear permanently.

Sheldon (1930) has devoted particular attention to this point. Among the children admitted to West Wickham and re-examined at yearly intervals since their discharge, retrogression of physical signs has been noted in about 60 different cases.

Transient diastolic murmurs apparently differ in no way from those which later become more and more pronounced with progressive mitral stenosis. I have watched them appear, persist for three years, and then vanish for as long as I have been able to follow the patient. Usually their duration is shorter than this. On several occasions I have noticed these diastolic murmurs coincide with the development of subcutaneous nodules and have seen both disappear together. It is obvious that a clinical course of this nature is confusing, and that an original diagnosis of mitral stenosis may later require modification. With the uncertainty which surrounds these early physical signs it is perhaps better to label such lesions *potential mitral stenosis*.

In the group of cases to be considered mitral stenosis has only been diagnosed when the accepted physical signs have stood the test of time. Even so a few may have been wrongly included under this heading.

The early signs of *aortic regurgitation* are sufficiently well known not to require any description, though diastolic murmurs to the left of the sternum are often missed. Transient inflammation of the aortic valve with temporary regurgitation can also arise. Poynton (1918) described this many years ago, and it occurred for a while after fresh manifestations of rheumatism in 10 of my patients. Further reference to the development of mitral and aortic disease will be made when the effect of rheumatic relapses is considered. At this juncture it is sufficient to point out the extraordinary power of recovery that exists in a child's heart once the active inflammatory process is at an end.

Aortic stenosis need hardly be considered; it is exceedingly rare in children and young adults and there were only 3 examples in the 1000 cases.

In studying the future of a large series of rheumatic children it is convenient to divide them into various diagnostic groups, such as mitral regurgitation, mitral stenosis, aortic regurgitation, and so on. At the same time it would be wrong to suppose that the prognosis is mainly influenced by the particular type of valvular lesion present, which gives no more than a rough gauge of the dose of infection through which the heart must have passed. To that extent well-marked mitral and aortic disease is a certain indication of the original degree of myocardial inflammation. The size of the heart is a more accurate measure of the damage that remains, and in adults this has the greatest bearing on the prognosis. The same applies to children, but at this early age the rheumatic "state" is of paramount importance. Smouldering activity of the rheumatic process and liability to relapse are the most important factors which prejudice the child's chance of recovery.

ANALYSIS OF 1000 CASES

All the 1000 patients were re-examined at regular intervals except about 100, and information about these was obtained from their doctors or parents. Of the whole group 817 or 81·7 per cent. are now alive and well, 60 or 6 per cent. are in poor health, and 123 or 12·3 per cent. are dead. In Table I the cases living are arranged into groups according to the number of years they have come under review, and it will be seen that quite two-thirds have been followed for 4–10 years, and only about a third for a shorter period of 2–3 years. In order to obtain an absolutely accurate picture of the prognosis each case should have been followed for the same length of time. This has unfortunately not been possible, but a fairly clear idea of the general outlook can be obtained, particularly as most of the deaths took place within four years of discharge from the Heart Hospital at West Wickham. Moreover, well over half of those who are still living have reached adolescence or adult life, and many others have passed puberty, an age at which it will be shown that new powers of resistance against the acute rheumatic process are acquired.

TABLE I—AFTER-HISTORIES OF 1000 CASES OF JUVENILE RHEUMATISM

LIVING			DEAD		
Number followed for—	Age in years at last examination.		Time interval in years after discharge from hospital until death.		Deaths in age-groups (years).	
Yrs. Cs.			Yrs. Cs.		
			Under one: 17		
One: 21	0– 4:	0	One: 35		0– 4:	1
Two: 170	5– 9:	66	Two: 20		5– 9:	19
Three: 133	10–14:	357	Three: 15		10–14:	79
Four: 121	15–19:	367	Four: 13		15–19:	21
Five: 102	20 and over:	87	Five: 6		20 and over:	3
Six: 103			Six: 8			
Seven: 95			Seven: 4			
Eight: 70			Eight: 5			
Nine: 52			Nine: 0			
Ten: 10			Ten: 0			
Total 877		877		123		123

Of the 877 living 817 are well and 60 are in poor health.
Yrs. = years. Cs. = cases.

One of the most striking deductions that can be made from the figures just given is that children who survive their rheumatic attacks are later able to lead almost normal lives in a relatively good state of health, attending school with average regularity, and entering steady and useful employment when they grow up. There were, in fact, comparatively few invalids in this series. At the same time, a rheumatic child is never safe from relapses and these are the chief cause of renewed carditis, further damage to the heart, and of most of the deaths. These relapses are also reponsible for the long periods of interruption in the school career, to which these children are liable.

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Another feature of heart disease in the young is the usual lack of symptoms, once the active phase is over. Precordial pain, palpitations, and dyspnœa on exertion, to mention only three symptoms which may appear later in life, hardly ever trouble the child with a chronic lesion. Persistent evidence of failure is also uncommon. Naturally it was found in those cases that proved fatal, but among all the others, chronic failure with some degree of venous congestion has only become obvious in a very small proportion (14 cases). The child with "active" rheumatism and carditis, on the other hand, certainly has a number of vague symptoms of ill health, and if not promptly treated in bed may soon show signs of cardiac failure.

In Table II the cases have been arranged according to the valvular lesions present when the last examination was made. They have been placed roughly in order of severity. Those included in the "normal" heart group have no lesion now, although at some period there may have been evidence of carditis. The difference in myocardial damage underlying these various valvular lesions has already been mentioned, and no doubt it largely accounts for the increasing severity of the prognosis as we proceed through the list.

Poynton has often referred to the curious way in which aortic regurgitation follows mitral stenosis in rheumatism, and to the favourable prognosis when on rare occasions the aortic lesion occurs by itself. These points are well demonstrated by the present series.

Developed mitral stenosis is a much more serious condition. In its late stages it can cause great disability by "throttling the systemic blood stream

TABLE II—CASES ARRANGED IN GROUPS ACCORDING TO TYPE OF HEART LESIONS PRESENT

Type of lesion.	Well.	Not well.	Dead.	Per cent. not well or dead.	Total.
Normal heart	245	13*	—	—	258
Myocarditis	4	—	—	—	4
Mitral regurgitation ..	344	9	15	6·5	368
Aortic disease alone—					
Aortic regurg. ..	11	—	1	8·3	13
Aortic stenosis ..	1	—	—		
Mitral stenosis	166	28	78	38·9	272
Mitral and aortic disease—					
Mitral regurg. and aortic regurg. ..	3	—	—	45·6	85
Mitral stenosis and aortic regurg. ..	43	8	29		
Mitral stenosis and aortic stenosis ..	—	2	—		
Totals	817	60	123	—	1000

* Some of these are ill with renewed chorea or subacute rheumatism at the time of inquiry.

Note.—Mitral stenosis: early, 39; developed, 194; undetermined, 29. Aortic regurgitation: slight, 1; free, 8; undetermined, 3. According to Grant's (1933) classification.

at its source" even though the myocardium has recovered from the original infection (Poynton 1918). The figures here show that the outlook was bad and the death-rate high in well over a third of the children with this lesion. With mitral and aortic disease combined the prognosis was even worse, although the observations of Still (1924) and others point in the opposite direction. Cotton's (1931) experience in regard to mitral stenosis in boys has been so bad that he wonders "whether it is worth while treating such cases in a special convalescent home." His deductions are based on less than a hundred cases, and the results so far obtained at West Wickham have been encouraging enough to warrant the recommendation of further admission of mitral stenosis, although cases with earlier lesions are more desirable.

The profound influence of the size of the heart on prognosis is well shown in Table III. Here the benign nature of mitral regurgitation in comparison

TABLE III—PROGNOSIS IN RELATION TO CARDIAC ENLARGEMENT

Lesion.	Number of cases.*	
	Well.	Ill or dead.
Mitral regurgitation—		
No enlargement	240	17 (6·6%)†
Appreciable enlargement ..	57	2 (3·5%)
Marked enlargement	4	1 (25·0%)
Mitral stenosis—		
No enlargement	70	22 (23·9%)
Appreciable enlargement ..	48	40 (45·3%)
Marked enlargement	16	37 (69·8%)
Mitral stenosis and aortic regurgitation—		
No enlargement	8	3 (27·3%)
Appreciable enlargement ..	22	15 (45·3%)
Marked enlargement	12	18 (60·0%)

* The cases are grouped according to the size of the heart when last examined—i.e., at the end of their respective follow-up periods and in case of deaths before the relapse.

† Mostly cases that died of acute relapses with pericarditis.

with other valvular lesions is also illustrated, and the almost identical effect of cardiac enlargement whether one or two valves are involved. Cotton (1919) states that a "breakdown is more likely to occur when the heart is enlarged" and Grant (1933) in his excellent study of adult heart disease concludes that "the after history is to be foretold not so much ... by the type of (valve) defect but much more closely by the degree of cardiac enlargement and by the grade of cardiac failure. ..."

The same is true in childhood, but at this age the heart certainly has greater powers of recovery and well-marked cardiac enlargement is not always necessarily permanent. On the other hand, subacute bacterial endocarditis and auricular fibrillation, the two chief factors which modify the prognosis in adults, are uncommon in children. In their place, however, is the liability to a fresh onset of rheumatism and with it the danger of further carditis.

EFFECT OF RELAPSES ON THE ULTIMATE COURSE OF THE DISEASE

Since most rheumatic children come under the care of a succession of doctors and hospitals during the course of their illness, it is usually difficult to discover at what particular stage the heart is first affected. Certain facts, however, are known. Although there is some evidence that in recurrent chorea or arthritis the heart is more liable to become affected during the first or second attacks than later (Findlay 1931), it is generally held that heart disease is more common in children who have had repeated attacks of rheumatism. Except in the very young a fatal first attack of rheumatism in childhood is exceptional and the majority of deaths from heart disease are the direct result of rheumatic relapses. A large number of children recover from relapses but are left with more cardiac damage than before.

At West Wickham and subsequently we have had a chance of observing the whole course of events in many such cases and especially of studying the development of mitral stenosis. Recurrence of

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chorea or arthritis was seldom encountered under the open-air conditions of the country. The most common type of relapse has been serious fresh cardiac disease following acute tonsillitis, or pharyngitis when the tonsils had been previously removed.

TABLE IV—RELAPSES

Cause.	Effect.	Result.	
		Alive.	*Dead.*
Acute upper respiratory infection—			
Tonsillitis .. 37	Pericarditis .. 25	8	17
Pharyngitis .. 13	Carditis 27	17	10
Diphtheria .. 2	Rheumatic fever (no fresh carditis) 9	7	2
Tonsils and adenoids operation .. 2	"Miniature rheumatic fever" .. 6	5	1
Bronchitis .. 1			
Chorea 2	Total 67	37 (55%)	30 (45%)
Undetermined .. 10			

Occasionally, but not often, the operation itself reacted in the same way and provoked a relapse. Further rheumatic carditis may also follow diphtheria, probably as a result of the streptococcal tonsillitis so often associated with this infection. The various causes of the rheumatic relapses witnessed are set out with their relative frequency in Table IV. It will be seen that serious carditis or pericarditis occurred in a large proportion and resulted in a high mortality.

Fortunately some patients escape with only major or minor forms of rheumatic fever and there is no fresh cardiac involvement. Nevertheless, in the whole group the death-rate is as high as 45 per cent., and in many instances the relapses proved fatal within a few weeks. Others made a temporary recovery but ultimately succumbed to fresh rheumatic recurrences after a short lease of life. The remaining 55 per cent. are alive and well in nearly all cases, though in a good many the relapse has resulted in further extension of heart disease, such as the development of mitral stenosis or aortic regurgitation. The serious effect of a rheumatic relapse can persist for a long time, but eventually the patient makes a good recovery, and in this series no death was recorded after a period of five years (Table V). The effect of rheumatic relapses is also greatly influenced by the age of the patient. The mortality is high up to the age of 14 years; it then falls so abruptly

TABLE V—NUMBER OF YEARS SINCE RELAPSE

Time.	After-history.		Time.	After-history.	
	Alive.	Dead.		Alive.	Dead.
Under 6 mths.	0	13	6 years.	5	0
1 year.	1	4	7 „	6	0
2 years.	3	5	8 „	5	0
3 „	6	3	9 „	3	0
4 „	3	3	10 „	2	0
5 „	3	2	Totals	37	30

that the onset of puberty seems to be the only likely explanation (Table VI). This is further proof of my previous contention that the future of a rheumatic child depends largely on his ability to weather the storm during his early years and to reach the calmer waters of adolescence, when rheumatic relapses are less frequent and the power of resistance increases. Other considerations such as the child's age at the onset of the disease, the time of the cardiac relapse, and the type of valvular lesion present have on the whole little influence on the immediate prognosis.

At present there is no certain way of avoiding relapses, but if there were only some means of minimising their virulence so that the patient's resistance was not completely overwhelmed at the time, there would be more chance of steering the child safely past puberty.

ASPIRIN THERAPY

With this in view seven years ago routine aspirin therapy was instituted at the Children's Heart Hospital, West Wickham, in every case of throat infection. The details of this treatment will be given in the next lecture; here it is enough to say that its result has been so favourable as to recommend its universal adoption by doctors in charge of rheumatic children. The records show that rheumatic recurrences were less frequent in those who had received adequate aspirin therapy from the onset of their throat infection, and in the event of a relapse, that recovery was the rule (21 recoveries; 6 deaths). On the other hand, when this treatment was omitted, recurrences were frequent and severe, and the death-rate was high (11 deaths; 13 recoveries). The method, however, is not infallible and its neglect does not always entail

TABLE VI—AGE OF DEATH OR AT LAST EXAMINATION ALIVE

After-history

Years.	Alive.	Dead.
0– 4	—	—
5– 9	1	5
10–14	16	25
15–19	13	0
20 and over	7	0
Totals	37	30

serious consequences. At the same time the figures given in Table VII take no account of the numerous relapses which might have followed tonsillitis had this particular treatment not been administered. The distinct diminution of virulent relapses at West Wickham since aspirin therapy was begun also testifies to its general efficacy.

EXTENSION OF CARDIAC DISEASE

The progressive nature of juvenile heart disease is well known, but the exact way in which the extension takes place is not quite clear. There are some who believe that mitral stenosis, for example, is a very gradual process due to the slow cicatrisation of the damaged valve and its surrounding areas. This manner of onset might explain the occasional case of mitral stenosis which develops after a single rheumatic attack, with a gradually increasing presystolic murmur as the only evidence of cardiac involvement. During that time all the usual signs of rheumatic activity may be wanting. More often extension of the disease can be definitely traced to a recent relapse or to several relapses, any of which may further damage the heart. In this manner the heart may pass through the stages of a mitral regurgitation, mitral stenosis, and combined mitral and aortic disease in a series of steps.

In institutions such as the one at West Wickham, where convalescent children remain under observation for many months at a time, there is an ideal opportunity for studying the process, and certain facts that have been learnt about the extension of

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valvular lesions have been tabulated in Table VIII. From this it will be seen that the development of mitral stenosis in children who already had mitral regurgitation definitely resulted from a rheumatic relapse in 80 per cent. of the cases. The time-

TABLE VII—EFFECT OF ASPIRIN THERAPY ON THE SEVERITY OF RHEUMATIC RELAPSES FOLLOWING TONSILLITIS

—	With aspirin.	Without aspirin.
Number alive	21	13
„ dead	6	11
Mortality following relapse..	22 per cent.	45 per cent.

interval between the relapse and fresh signs of heart disease varied between two weeks and six months, which shows that after any relapse a case should be carefully watched and treated for a considerable time.

The development of an aortic lesion, usually in the presence of old mitral disease, seems also to be definitely related to a preceding relapse. This connexion was found in 58 per cent.—not quite so often as in the case of mitral stenosis. It may take seven months before aortic regurgitation becomes apparent after a relapse; by that time the active inflammatory state may be over and the fresh physical signs probably point to renewed cardiac power and a healing valvular lesion.

The appearance of subcutaneous nodules in some cases just at the time when the disease is spreading throws some light on the probable cardiac pathology, but there will always be a certain number of children who develop their cardiac lesions insidiously and without other evidence of rheumatism to serve as a warning.

Before leaving the whole question it is interesting to compare the frequency with which relapses of chorea and rheumatic fever are followed by fresh cardiac involvement. Duckett Jones and Bland (1935) regard chorea by itself as a relatively benign complaint and state that the special liability to heart

TABLE VIII—EXTENSION OF VALVULITIS IN RELATION TO RHEUMATIC RELAPSES (47 CASES *)

Type of relapse.	Extension of heart disease.		
	From mitral regurg. to mitral stenosis.	From mitral stenosis to mitral stenosis and aortic regurg.	From a normal heart to mitral and aortic disease.
Rheumatic fever† ..	13	4	2
Chorea	7	2	—
Subacute rheumatism ..	2	—	—
Carditis (following tonsillitis)	3	1	—
Insidious (no apparent relapse)	6	5	2
Total	31	12	4

* Followed for an average period of five years: 33 well, 4 ill, 10 dead.
† Preceded by tonsillitis in many cases.

disease only arises when some other form of rheumatism has also been present. Without going quite to this length Findlay (1931) also believes that arthritis is a greater potential danger to the heart than is chorea. My experience has been the same (see Table IX).

PERICARDITIS

Pericarditis, being almost always associated with widespread damage to the heart muscle, is undoubtedly one of the severest forms of cardiac rheumatism and has a high mortality. It is comparatively rare during a first attack of acute rheumatism. As a rule it makes its appearance during a relapse following an upper respiratory infection in a child with established heart disease, and it is then particularly dangerous.

I have been able to follow 62 old cases for an average period of six years. Of these 62 patients 31 are dead (a mortality of 50 per cent.), 24 (39 per cent.) are alive and well, and 7 (11 per cent.) are more or less cardiac cripples. Two-thirds of the deaths were the direct result of the acute attack, often within a few weeks of its onset; in the remaining third, death was delayed for a number of years, but the children were in poor health and suffered from smouldering rheumatism or repeated relapses. Subcutaneous nodules were often associated (in 30 per cent.) and their presence was an unfavourable sign.

TABLE IX—EXTENSION OF HEART DISEASE IN RELATION TO RELAPSE OF VARIOUS FORMS OF RHEUMATISM

Type of relapse.	Relapses.	Heart disease.		Total.	Incidence of fresh carditis.
		Transient carditis.	Permanent extension.		
					Per cent.
Chorea	77	6	8	14	18·0
Subacute rheumatism	66	5	10	15	24·2
Rheumatic fever ..	77	8	14	22	28·6
Chorea and rheumatic fever ..	7	—	3	3	42·8

It was also found that patients who had once had pericarditis were liable to a second attack. When this occurred the prognosis was bad.

Children who survive pericarditis are usually left with severe myocardial and valvular damage, and the heart's action may also be seriously impaired by an adherent pericardium. Yet occasionally recovery may be so complete that years later it is difficult to imagine that there had ever been any serious heart disease present. I have notes of 7 such cases.

Whatever the outcome, the acute attack is nearly always a desperate affair; but I have seen amazing recoveries in children who appeared to be on the point of death.

Findlay's assessment of rheumatic pericarditis in Glasgow (1931) does not differ considerably from mine, although he places the mortality higher (63·4 per cent.), and even among those who did recover, his proportion of cardiac cripples was greater than we in London have been led to expect.

NODULES

Subcutaneous nodules have always rightly been regarded as a sign of serious rheumatism and as an external indication of similar inflammatory processes in the viscera, particularly the heart. The mortality is undoubtedly high and Poynton and Paine (1913) found that 54 per cent. of their fatal cases had had nodules some time during the course of their disease. It is therefore of special interest and practical importance in regard to the selection of the most suitable cases for convalescent treatment to ascertain the after-history of those children who recover.

I have been able to follow 90 cases, most of which had been seen during the active stage of their nodules.

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Of these, 36 (40 per cent.) are dead, 45 (51 per cent.) are in good health at the time of this inquiry, and 7 (8 per cent.) are alive but ill. It is interesting to find that this mortality-rate of 40 per cent. among children mostly domiciled in and around London is almost identical with that worked out by Findlay among Glasgow children (42 per cent.).

My inquiries cover a decade and many of the children have been followed for 5–10 years. As quite three-quarters of the deaths took place within three years, it is fairly safe to assume that the figures given are a reasonably accurate estimate of the prognosis.

Nodules can appear at any age in childhood, although they are rare before seven years and uncommon after puberty. Another important point is that up to the age of fourteen, children who have had nodules stand only an even chance of survival (33 deaths; 22 recoveries), but thereafter puberty seems to have a remarkable effect on the prognosis. In this series, once they had passed that age recovery was the rule and death uncommon (2 deaths; 22 recoveries). We are thus constantly reminded of the increased power of resistance which comes with puberty.

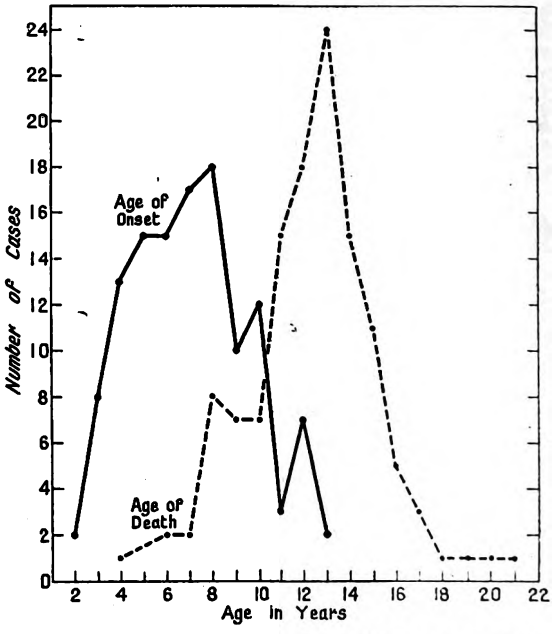
Cheadle's famous dictum that "the appearance of massive nodules was the equivalent of a sentence of death" has perhaps given his successors an unnecessarily grave outlook on this particular rheumatic manifestation. It is true that the number of nodules is to a certain extent a measure of the "dose" of rheumatic infection, and a rough count which I have carried out weekly in a series of cases gives some support to this view. In 54 cases in which this was done there were many more recoveries (31 recoveries; 7 deaths) when the number of nodules did not exceed a total of ten in various regions of the body, than when the number counted was well over that number (5 recoveries; 12 deaths). This is by no means a constant rule and one boy who reached the record of over a hundred nodules in 1929 is now quite a strong young man at work. In general, however, the prognosis is bad in patients with nodule counts between twenty and forty, and many of those who recover are found never to have had more than one to four obvious nodules during their most active stage. In a few subjects the nodule formation was no more than a definite thickening of the olecranon bursa which subsided after some months.

It is often said that nodules appear in a series of fresh crops; it must not be assumed from this that the individual nodule has only a short life-history. Careful examination will show quite clearly that each nodule may persist for months, though fresh ones may appear in the same area. On the other hand the whole process may only last a few weeks. The length of time that nodules are present seems to have no relation to the prognosis. The two longest periods over which I have observed persistent nodules were three and five years; the first child recovered, the second died.

The almost invariable association of nodules with carditis is common knowledge. Heart disease is often severe and I have notes of 4 instances of auricular fibrillation. It is improbable that a rheumatic infection severe and extensive enough to produce subcutaneous nodules will ever leave the internal organs, and particularly the heart, free from similar inflammatory lesions. In other words it is almost impossible for nodules to exist without heart disease. In certain instances the myocardium is the chief seat of inflammation and the valves escape; both the subcutaneous and cardiac lesions may then heal completely in favourable cases. I have been able to follow 5 cases where something of this kind must have happened, and now, a good number of years later, all evidence of cardiac disease has entirely disappeared. Still (1924) has quoted two similar examples.

The frequency with which acute rheumatism recurs in the original form during a relapse has been stressed and this is also true of subcutaneous nodules. In 11 children (12·5 per cent.) nodules appeared with a fresh outburst of rheumatism on more than one occasion. In all probability this figure is a conservative estimate. The mortality was found to be high in this type of case.

It would be fair to conclude from this analysis that the presence of nodules should be regarded with some anxiety but need never be taken as a fatal omen. Provided treatment is prolonged until all signs of rheumatic activity have subsided, there is an even chance that the child's future will be favourable.



Graph illustrating age of onset of rheumatism and age of death in 123 cases.

A RASH

Erythema marginatum, sometimes alluded to as multiforme or circinate, is a curious skin eruption which is occasionally seen in juvenile rheumatism. The eruption is not a very common manifestation, and I can only find notes of 13 cases among the 1000 which are now under review. Nevertheless it has a definite influence on the prognosis.

With two exceptions nodules were observed in each instance, and there appeared to be a certain loose relationship between the state of the nodules and the extent of the rash. On the other hand the rash often outlasted the nodules by many months and still remained after all other evidence of active rheumatism had disappeared. The rash has a habit of waxing and waning over long periods, and in three children, all of whom ultimately recovered, it recurred periodically apart from any other evidence of rheumatism for 3, 5, and 9 years respectively.

Of particular interest is the fact that despite the severe and extensive form of rheumatism and cardiac

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disease with which the rash is generally associated, the ultimate prognosis is surprisingly good. In the 10 cases which I was able to follow for a good number of years only 2 patients died and 8 are well at the present time. Moreover, in 4 the cardiac lesions have definitely diminished in severity. Bruce Perry (1937) has come to the same conclusions and states that in 4 of his 13 cases all abnormal cardiac physical signs ultimately disappeared. It seems, therefore, that the advent of a circinate rash in a case of rheumatism with nodules is, if anything, a welcome sign.

DEATHS

Taking into consideration only cases of definite and persistent heart disease, the mortality in this series was 16·4 per cent., a figure which would have no doubt been higher had there been opportunity of following every case for ten years.

The death-rate increased gradually up to the age of thirteen years and then fell rapidly (see Figure). The age of onset of rheumatism in this group also showed a corresponding curve some five years earlier with the highest point at the age of eight.

Acute carditis was the cause of death in about two-thirds of the cases; less commonly the disease took a more chronic course and the children eventually died after prolonged cardiac failure. Subacute bacterial endocarditis was the terminal event in a few cases and auricular fibrillation the fatal turning-point in several others.

Sudden death occurred in some instances, the history in each case strongly suggesting a cerebral or pulmonary embolus.

It is repeatedly stated that rheumatism in very young children has a serious prognosis. In so far as there is greater opportunity for rheumatic relapses and hence for progressive cardiac damage before the haven of puberty is reached this is no doubt true. Interference with the growing valves and muscle of the heart would seem to be another factor; but it is amazing to what extent a rheumatic inflammatory process can completely resolve. In the present series early onset of the disease did not seem to entail a specially bad prognosis.

CONCLUSIONS

The main points with regard to the prognosis can now be summarised. Rheumatic heart disease in childhood is likely to be serious, but on the whole the outlook is not unfavourable. Many cases with every prospect of being left with severe cardiac lesions make remarkable recoveries if treated in the right way. Puberty appears to have a great effect on the patient's power of resistance and the course of the disease is therefore generally much less acute in adolescence. Rheumatic relapses are the greatest dangers; they commonly follow acute throat infections and are apt to repeat themselves in the same form in each particular case. Aspirin has been found a valuable prophylactic agent. Mitral stenosis alone or with aortic regurgitation is a formidable lesion, particularly in the presence of much cardiac enlargement. Acute carditis with pericarditis has the highest mortality of all; nodules are the chief sign of a widespread rheumatic inflammation, but with patience and proper care even this type of rheumatism will subside and many children will ultimately make a good recovery.

My second lecture will largely be devoted to a consideration of how this can best be achieved.

(*References at foot of next column*)

CLINICAL OBSERVATIONS ON THE EFFECT OF THE PARENTERAL ADMINISTRATION OF VITAMINS A AND D

BY W. NORMAN LEAK, M.A., M.D. Camb.

THIS paper records my experiences with the administration of a concentrated oily preparation of vitamins A and D by intramuscular injection. I first began to use these injections in a very tentative way in 1930 because I was impressed by the fact that many patients, who might be expected to benefit by the action then credited to those vitamins, were prevented from receiving them owing to vomiting, operation, or other causes. The preliminary results seemed so promising that I have pursued the matter further in an ever-widening investigation, and it seems opportune to restate and amplify the conclusions I first published in 1933.

It must be emphasised that the whole of this work has been undertaken in the course of a general country practice. Cases have therefore had to be taken as they arose, and it is impossible to give long lists of cases with controls. As, however, some 1500 injections have been given and the effects carefully watched, it is hoped that the results may be of some scientific value even though some are technically mere "impressions." As a result of this enforced method of working many interesting points have undoubtedly been missed; but the general effect has been so uniformly striking that it has needed no great clinical acumen to appreciate it, and as a rule the type of case has been so well known that consultant status was not required to diagnose or evaluate it. It is known, for example, that a well-established case of iritis does not rapidly cease to cause pain, and show improvement, without some definite cause; that rapidly rising temperatures do not usually reach their peak soon after midday; that the erythematous rash of herpes zoster seldom fails to progress to vesicle formation; or that patients with general peritonitis do not generally look very well. Yet all these things have been observed, not once only but regularly, in this investigation, and it is with such gross clinical observations that my paper mainly deals.

The preparation used has been one specially prepared for me by Glaxo Laboratories Ltd., and contains as its active ingredients 60,000 international units of vitamin A and 10,000 international units of vitamin D per cubic centimetre. For convenience I shall refer to this preparation as Dekadexolin, being equivalent in strength to ten Adexolin capsules. In this investigation I have used doses varying from one to

(*Continued from previous column*)

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five cubic centimetres in 24 hours, and it is worth stressing that this dosage (up to 300,000 international units of vitamin A in 24 hours) is much higher than any usually employed. It has not been used from any innate love of high doses, but because preliminary investigation with much smaller doses showed that there were distinct advantages in the large doses of dekadexolin. Though I have had a few cases of long-continued high dosage (2,000,000 units of vitamin A or so) which are not recorded here, in the main the work has involved only a few doses of dekadexolin during a few days. Although actually my results agree very well with the well-known experimental work on vitamins A and D, to which I am most indebted, it should be realised that prolonged deprivation is no absolute guide to the effects of excessive supply; for example, the symptoms of Graves's disease would hardly be inferred from the study of myxœdema, and a temporary excessive dose may not give the same results as a long-continued one (cf. acute and chronic alcoholism).

Experimental work with animals seems to suggest that vitamin A has something to do with the power of resistance of the host to infection, and dekadexolin has been used in a large variety of cases of local and general infection. These include tonsillitis, carbuncles, iritis, influenza, erysipelas, pneumonia, measles, and clinical septicæmia (distance from a laboratory makes satisfactory blood cultures difficult to obtain). I appreciate that they are all conditions in which it is difficult to get strict controls; but a comparison of six years' ever-increasing use of dekadexolin with the previous sixteen years of more normal treatment leaves no doubt in my own mind of its beneficial effects, and this opinion is shared by those patients who have had sufficient past experience to make them judges of the subjective results. I may as well say at once that I am convinced that the effect of dekadexolin is different from that of Omnadin—and probably also of S.U.P. and protein shock in general, though I have not had very much experience of these. I have seen several cases in which dekadexolin failed to give me the result I wanted, but

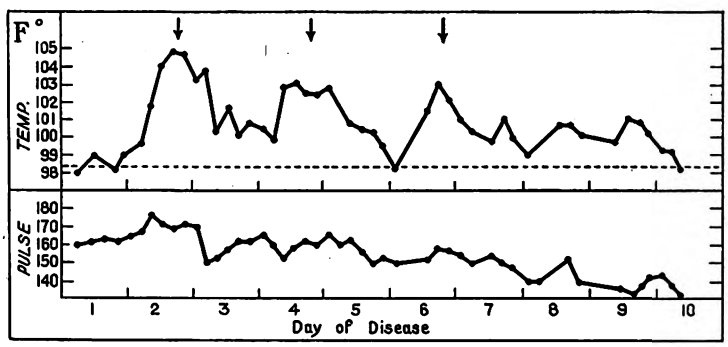

FIG. 2.—Extensive scalds in a child 14 months old.

this has followed when omnadin was employed; and I have had many in which omnadin seemed to fail but dekadexolin to succeed; and frequently I have used the two treatments together.

SOME ILLUSTRATIVE CASES

The chart shown in Fig. 1 is from a case of a kind with which most practitioners are unfortunately familiar.

A boy, aged 8, had a subacute appendix removed on April 1st, 1937. Two days later his temperature began to rise rapidly, he had acute pain on the right side with typical signs of consolidation and pleurisy. The breathing, cough, and later on the rusty sputum were typical of pneumonia, a diagnosis which was, incidentally, confirmed (not that it was really needed)

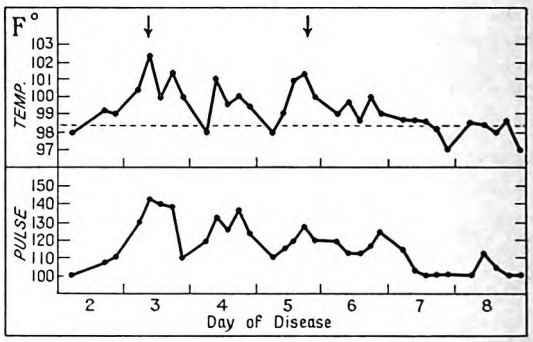

FIG. 1.—Pneumonia after appendicectomy. In this and the following charts each arrow indicates an injection of 1·0 c.cm. of dekadexolin.

by the local tuberculosis medical officer who happened to be seeing another case for me at the time. Later on a large effusion appeared, which took about two weeks to be absorbed. Antiphlogistine poultices were applied locally, and dekadexolin was given twice at the times marked on the chart. A mild expectorant mixture was also given, but beyond that no other treatment. As usual in these cases the temperature, respiration and pulse-rates became normal some while before the physical signs cleared up, but after the first day the child showed little distress or trouble of any kind.

Two points strike one prima facie from the chart—first, the apparent rapidity of action of the dekadexolin, and secondly, that its effect seemed to persist for some 36–48 hours. The first point is nearly always observed in febrile cases, and I have noted a slight drop in an otherwise rapidly rising temperature as little as half an hour after a dose of dekadexolin. The period of 36 hours is also usually observed in all but the acutest infections. It is probably the time taken for the product to be absorbed, and the way to get more intense effect is not to give a larger dose but to give several separate doses in order to increase the relative area from which it can be absorbed. Single doses of 2 c.cm. give little more immediate effect than 1 c.cm. and are always painful. Care must, of course, be taken not to inject the oily solution into a vein. It is easier to inject if previously warmed.

A case which shows the same features, this time one of my early ones, is shown in Fig. 2.

On Nov. 3rd, 1931, a boy of 14 months was severely scalded, about a third of the body being involved, chest, neck, chin, and tongue, both arms and both thighs; scalds ranging from the first to the third degree. The local treatment was tannic acid to a few areas, a boric and eucalyptus ointment to most. As the chart shows, with a pulse-rate running up to 170, the child was profoundly ill. On the second day the temperature rose rapidly to 104·8° F. with pulse and respirations to match, and I suspected bronchopneumonia at the left base. Dekadexolin was given and within six hours the temperature had dropped 2° and the next day the child seemed less ill. The second injection was followed by a slower but more complete drop in temperature, though not of pulse or

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respiration, and the child seemed remarkably well. A third injection was given for a third rise of temperature and in spite of some irregular fever the child made a complete and uninterrupted recovery.

Once again the 36-hour period is clearly marked, and it may be noted that the dose was the same for the infant as for the larger child. As a matter of fact, apart from any local pain or swelling, dekadexolin seems remarkably innocuous (it must be remembered that we are here dealing presumedly with a strictly temporary intense hypervitaminosis and not with a long-continued one). This was shown by an unwanted illegitimate baby of six months who came under my care when practically moribund after about a month's broncho-pneumonia. The chart (Fig. 3) speaks for itself. The first injection seemed to give the child sufficient power to show some reaction to its infection. The four subsequent ones seemed to terminate the illness, apart from the rise on the fifth day. Whether because of, or in spite of, the heroic doses, the baby made a complete recovery and showed no ill effects from receiving 300,000 units of vitamin A and 50,000 of vitamin D in 48 hours.

I myself, in 1933, when suffering from septicæmia (contracted from a patient who died of it) received 25 c.cm. (1,500,000 units vitamin A) in six days. This was deliberate over-dosage to test for any ill effects, but I was not able to detect any.

Such cases as these could be multiplied many times, though seldom with four-hourly temperature charts; for in a country practice such things are almost unobtainable outside the local hospital. The result I have found is almost always the same, and when it does not follow there is usually some unsuspected cause at work. For instance, I was surprised not to see the expected improvement within twelve hours in a bad case of tonsillitis, but another twelve hours showed the typical rash of scarlet fever. As the patient was at once taken to the isolation hospital, I was prevented from seeing what effect more dekadexolin would have in such a case.

A very interesting case was that of a woman of 78 with pernicious anæmia who had many falls as a result

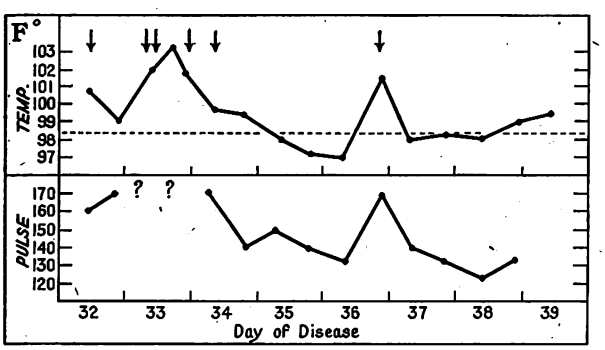

FIG. 3.—Broncho-pneumonia in an infant 6 months old.

of combined degeneration of the cord. When first seen there was considerable cellulitis of the arm with underlying periostitis. As no improvement took place on ordinary treatment within 48 hours—in fact she got decidedly worse—I commenced to give dekadexolin; improvement was immediate, and after four injections the arm got quite well. She was in bed altogether three weeks as a result of her accident, and to my surprise when she got up she was much steadier on her feet than she had been when her accident took place, whereas rest and infection almost always cause deterioration in such cases. I thereupon discussed the case with Prof. A. Ramsbottom of Manchester, who had seen the patient before and confirmed these particulars, and it seemed most probable that the improvement noted was due to the action of the large doses of vitamin A on the demyelinised nerve-fibres. I therefore, on Jan. 14th,

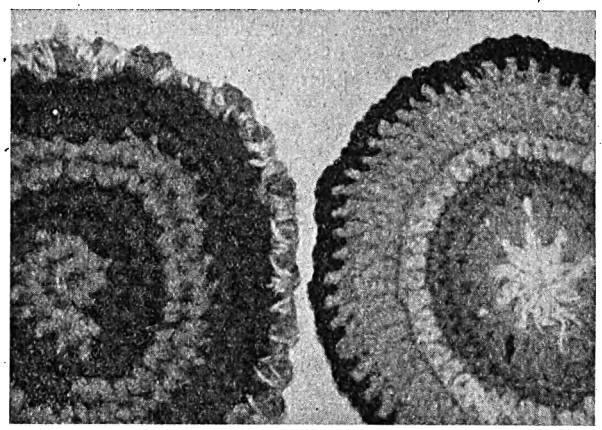

FIG. 4.—The left-hand mat was made on Jan. 14th and the right-hand one on Jan. 27th. The difference in workmanship is a measure of the patient's improvement.

1933, began to give her some more injections of dekadexolin. There was no doubt that her mental alertness improved greatly, but still more evident was the effect on the control of her hands, which had begun to suffer as a result of the degeneration of the cord, so that she could barely do the coarsest knitting. In a fortnight, after five injections, she was sewing as well as she had done for a long while before, and Fig. 4 gives some idea of the change which took place in the fineness of her stitching, though it cannot show the equally striking improvement in colour and design which is obvious in the originals.

This case started me trying the effect of dekadexolin on various nervous diseases, but in general practice these are few and far between. One case which I, my partner, and the local medical officer of health (Dr. L. J. Picton) agreed in diagnosing as early encephalitis lethargica undoubtedly improved very much after receiving 8 c.cm. in two weeks and has remained well in the intervening four years. His symptoms were fever, vomiting, distinct hebetude, ptosis, some facial palsy, increased knee-jerks, normal plantar and eye reflexes. I have tried the remedy in well-established cases of parkinsonism without any result. Two nerve cases however showed dramatic results.

One patient was a girl of 21 who suddenly became blind in her left eye in February, 1933, and after prolonged investigation in Manchester Royal Infirmary was finally diagnosed as early disseminated sclerosis. She made slow irregular progress and in April, 1933, her vision was still very poor (6/60). Doing my utmost to prevent any psychological effects, I gave the girl a dose of dekadexolin. Two days later she read 6/12, and after one more injection her vision was nearly 6/6. At that time her two fundi were apparently quite normal. Eighteen months later I had occasion to send her to see an ophthalmic surgeon and to my surprise his report was that though the left disc showed the typical whiteness, &c., of complete optic atrophy there was no diminution of the field of vision and that, with a suitable correction, the acuity was well up to normal. Thus it appears that the lurking suspicion I had that this might be mainly a case of neurosis was unjustified.

A rather similar and earlier case was a man who had been diagnosed at the Manchester Royal Infirmary as having optic atrophy of unknown origin with a hopeless prognosis, and when I first saw him his vision was below 6/60. Here recovery was rather

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slower. His first injection was on March 17th, 1933, and on the 27th, after four injections, he pointed out to me three dogs playing in a field about 300 yards away. His vision was 6/9 beyond which it did not improve materially.

It is known that vitamin A has some effect on preserving the integrity of the body surfaces, and a disease which borders on the dermatological and neurological is herpes zoster. During the past three years I have treated nine cases of this malady with dekadexolin with consistent results. If the case has been a very early one with few vesicles formed, and an erythema where vesicles seemed to be appearing, within 24 hours of an injection of dekadexolin the formation of vesicles has quite ceased, and those that have formed have rapidly subsided. Post-herpetic pain also has not occurred in these cases. If the vesicles are all fully developed when the case is seen dekadexolin seems to have little effect, but my experience of such cases is too limited to say definitely. The effect of dekadexolin in this condition—a virus disease which affects a nerve-cell—makes me think that it is a form of treatment well worth trying in acute poliomyelitis. It can do no harm, and it might do a great deal of good; but I have had no opportunity of trying it so far. A large initial dose would seem desirable.

Another condition in which I have observed the effect of dekadexolin is the healing of chronic ulcers. My earliest investigations of the effect of dekadexolin were made on moribund and often unconscious patients who had broken-down wounds or bed-sores. In these in the last few days of life, when the patients were actually dying, there several times seemed to be definite local improvement. However I was led to try the effect on chronic ulcers by having two patients who developed erysipelas while being treated with adhesive elastic bandages. The erysipelas was treated with dekadexolin, and to my astonishment in each case the original ulcer healed with remarkable rapidity, in one case the first time for 18 years. I have tried it in several cases since. I have only once seen it seem to cause healing without any other therapy to the ulcer at all, but when other treatment seems disappointing I have several times seen rapid healing take place as soon as injections of dekadexolin were started, and also seen deterioration set in when the injections were stopped. Specially marked has been the way that, apparently under its influence, new, healthy, and adherent skin will spread over high granulations which ordinarily would have to be treated in some way before healing could take place. This suggests a possible application in difficult cases of skin-grafting.

There is one more observation which is incapable of demonstration by charts or case records, yet which, to me, seems as though it may afford the key to what must seem a very miscellaneous series of cases. I refer to the general appearance of cases treated by dekadexolin. Almost without exception they look very well—in fact extraordinarily well considering their illness. This is most conspicuous in cases of peritonitis, after perforated appendix for example. Two or three days after operation they may look the picture of health and really feel well even though they are actually extremely, perhaps fatally, ill. If this point is not realised treatment of acute surgical or medical cases by dekadexolin may easily prove disastrous by lulling both patient and doctor into a false sense of security. I well remember a case of paralytic ileus following a perforated gastric ulcer which showed practically none of the usual signs of dehydration and shock one expects in such a condition. I saw him three hours before he died, seven days after his operation; his tongue was moist, his eye bright, and his skin elastic, and the experienced nurse attending him could not credit it when I said that in a few hours he would be dead.

WHY SHOULD THE REMEDY BE USEFUL?

This leads me to a brief outline of what I have come to believe about this matter. It is barely even an hypothesis, and in stating it, however, I do not wish to suggest that there is only one defence mechanism of the body, nor do I wish to ignore or be presumed ignorant of the many other natural or artificial means of combating infection.

I believe then that dekadexolin supplies vitamins A and D to the body, and that its action is mainly or entirely due to those vitamins. My reason is that its action is visible even when a patient is almost moribund, in whom the natural defences are probably exhausted and incapable of being stimulated any further. Furthermore its action is rapid and not accompanied by any of the usual signs of reaction, nor does it suggest clinically the action of protein shock. Its action is also to a large extent dependent on the dose, and within limits the larger the dose given the greater the effect. All these things suggest a direct rather than an indirect action; in fact, clinical results suggest that many disease states, and also the inhalation of fat-solvent anæsthetics, are associated with a disturbance of the mechanism whereby the stores of fat-soluble vitamins are made available in the body, and that this failure can be made good by their parenteral administration in an oily solution.

Next, the appearance of well-being that the injections produce suggests that these vitamins supply to the cells of the body something which they require for complete health. As a hazardous guess one might suggest that they have to do with conserving the tissue fluids, for in many conditions in which one would have expected to see dehydration it has been notably absent. I may mention here that dryness of the tongue in a febrile illness seems a definite indication for dekadexolin as well as for fluids, and in my experience adequate dosage with dekadexolin will almost always prevent or abolish this distressing sign and symptom.

If what I have suggested is true these vitamins should not be regarded as being strictly part of the fighting forces of the body at all. Rather they seem to give what one might call positive health to some of the body cells, enabling them to withstand the effects of infection. They act like commissariat and medical services rather than artillery. They are not antitoxic in the way of neutralising the toxins, but they do seem to be able to render the cells more impervious to toxic effects, and probably help to repair damage. If this is so, it is only natural that their sphere of usefulness should be wide—very much wider than my limited opportunities have enabled me to explore at present. Experimental work has long suggested that this might be so. My work merely tends to show that the results obtainable in experimental work can be reproduced in actual practice by parenteral administration, whereas they may not be obtained when the vitamins are given by the mouth. In this it simply falls into line with experience of liver extracts, vitamin B_1, and other remedies. I hope that my inevitably fragmentary observations may stimulate further research to demonstrate the exact part played by each vitamin when so administered, and to delimit their spheres of usefulness. I would suggest particularly further use

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in nervous diseases, and I believe that dekadexolin might prove valuable in lessening the pulmonary damage caused by irritating gases,

For the general practitioner, however, I would sound a word of warning. While I believe the product would be of much help in many conditions, it is not one to be given light-heartedly. Though in about 50 per cent. of cases it causes no discomfort at all if the patient is in bed, the injections can be quite uncomfortable and even painful if given repeatedly. In serious cases this is of little consequence, but it is far otherwise if it has been given to treat an ailment which is satisfactorily treated in other ways.

SUMMARY

A concentrate of vitamins A and D suitable for parenteral injection is described.

An account is given of the benefits apparently obtained by injection of this product in a large variety of conditions encountered in general practice.

Clinical improvement is almost always observed in suitable cases, and administration of vitamins A and D by injection should receive wider trial.

I should like to express my thanks to the directors and staff of Glaxo Laboratories Ltd. for supplying much of the Dekadexolin gratis, and for much help in its preparation and use.

Winsford, Cheshire.

LEPTOSPIROSIS IN GLASGOW TRIPE-WORKERS

WITH REPORT OF A POSSIBLE CASE OF *Leptospira canicola* INFECTION

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Weil's disease (*Leptospira icterohæmorrhagiæ* infection) is being increasingly recognised in this country and is often associated with certain occupations or activities. Thus epidemic and endemic infections have been recorded in miners (Buchanan 1927), in sewer-workers (Fairley 1934, Alston 1935), and in fish-workers (Davidson and others 1934, Davidson and Smith 1936, Smith and Davidson 1936). Damp working conditions and the prevalence of rats are common factors.

The present investigation deals with infections occurring among tripe-workers in Glasgow. These are women employed at the corporation meat market to clean, scrape, and prepare tripe. As will be seen later, working conditions are wet, rats are numerous, and the workers are very liable to minor cuts and abrasions of the hands from the instruments used in their employment. Individual cases of Weil's disease in slaughter-house workers are mentioned by Buchanan and by Schüffner (1934); apparently such cases have occurred mainly on the Continent and no information has so far been obtained about any comparable investigation in this country. The disease was first noted in September, 1937, with the admission to the Royal Infirmary, Glasgow, of a female tripe-dresser.

CASE REPORT

A woman aged 23 was admitted on Sept. 16th. She had been employed for 8 years as tripe-scraper at the corporation meat market. Her illness began suddenly on Sept. 9th with shiver and headache. These symptoms continued for the next few days and were accompanied by considerable prostration, occasional bilious vomiting, and constipation. Jaundice developed on Sept. 15th. On admission she was moderately jaundiced and showed numerous small purpuric spots on chest, abdomen, and legs. Many minor scars were present on both hands and a more recent wound was seen on the dorsum of the right hand due to a cut received at work about a fortnight before she became ill. Chief complaint was a dull frontal headache. Temperature 101° F., pulse-rate 86, respirations 22. A leucocytosis of 19,800 was demonstrated soon after admission and a direct positive van den Bergh on Sept. 21st. She ran an irregular pyrexia for 20 days, but improvement in general conditions was progressive and she was discharged well on Oct. 26th.

Bacteriological investigations.—Serum was tested by Schüffner's method for the presence of antibodies, and urine was examined on various occasions by direct dark-ground microscopy and by guinea-pig inoculation for the presence of leptospira. The results are given in Table I. Guinea-pigs were inoculated intraperitoneally with the deposit and 1–2 c.cm. of the supernatant fluid of centrifuged urines. Occasionally one guinea-pig was inoculated with more than one specimen for economy, but separate animals were each inoculated with one of two specimens received on the 21st day of illness. The second specimen was obtained 2 hours after the first in case prolonged exposure to the antibodies, demonstrated in the bladder urine, might diminish the invasiveness of any leptospiræ present. No conclusions were reached. Guinea-pig A became ill 4 days after inoculation and *L. icterohæmorrhagiæ* was recovered in culture from heart blood on the 5th day. The animal never showed any jaundice and recovered completely. It was killed 41 days after inoculation, when it gave a positive sero-reaction to a titre of 1 : 100. Leptospiræ were recovered in culture from the kidneys, but were not found in culture or in Levaditi stained preparations from the liver and suprarenals. Guinea-pig B died after heart puncture on the 4th day after inoculation. Leptospiræ were not recovered in culture, and another guinea-pig inoculated with a suspension of its liver and kidneys remained well. Guinea-pigs C and D remained well and leptospiræ were not recovered by successive heart punctures during life nor demonstrated in stained preparations after death.

TABLE I—BACTERIOLOGICAL INVESTIGATION

—	Day of illness.	Direct exam. for leptospira.	Schüffner's sero-reaction.		Result of guinea-pig inoculation.
			Agglutination.	Lysis.	
Blood	11th	—	1 : 1,000	1 : 3,000	—
	28th	—	1 : 3,000	1 : 10,000	—
Urine	11th	0	< 1 : 4	< 1 : 4	—
	15th	0	1 : 4	1 : 8	Pig A ; leptospira recovered.
	18th	0	1 : 32	1 : 64	Pig B ; none found.
	19th	0	1 : 16	1 : 64	
	20th	0	1 : 32	1 : 64	Pig C ; none.
	21st	0	1 : 16	1 : 64	
	21st	0	1 : 16	1 : 64	Pig D ; none.

— = not done.

General Investigation

On inquiry it was discovered that the number of workers employed in scraping and preparing tripe varied from about 15 women and girls in the summer to about 40 in the winter. In addition it was found that there was a continual drift from the occupation owing to marriage and other reasons, and that there was therefore a great individual variation in the duration of such employment. At the time of this

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investigation there were 28 employees in the tripe-scraping department and these fell naturally into three groups:—

(A) Girls, aged 16 to 30, in more or less continuous employment up to the present time. Some of them had been very recently engaged.

(B) Women, aged 33 to 43, employed as tripe-scrapers in the past, who had been away from this employment for a period of 7–16 years (married, &c.) and who had been recalled for temporary work.

(C) Male workers in the tripery, not employed as tripe-scrapers.

Blood was obtained from all these people and was investigated serologically. The results are given in Table II and include the case recorded above. There

TABLE II—SEROLOGICAL RESULTS IN 29 TRIPE-WORKERS

Group.	Cases.	Years employed as tripe-scraper.	Positive sero-reaction to *L. icterohæmorrhagiæ*.
A	6	Under 6/12	1
	6	1	0
	5	1– 5	0
	4	5–11	2*
B	5	5–12	2
C	3	—	0

* Includes reported case.

was evidence of infection in 3 out of the 21 persons in Groups A and 2 of the 5 persons in Group B. The three workers in Group C were negative. Prior to the serological investigation particulars of previous illnesses were obtained from all the workers and these were supplemented in some cases by later inquiry. The following details refer to people with a positive sero-reaction.

GROUP A

Case 1.—Admitted to hospital as scarlet fever one year ago; had a mild pyrexia lasting two days after admission and was discharged after six weeks with an altered diagnosis of tonsillitis and influenza. No jaundice.

Case 2.—Initial case referred to above.

Case 3.—Fairly severe "influenza" four years ago.

GROUP B

Case 4.—Very severe influenza "long time ago" during her initial period of employment. Headache was prominent—no jaundice remembered.

Case 5.—Twelve years ago illness started with severe weakness, cough, and pain in chest; diagnosed pneumonia. Off work three weeks.

It is not possible to say if these case-histories are pertinent. Undoubtedly a very large percentage of cases of Weil's disease can occur without jaundice (60 per cent.—Schüffner 1934), and are often mistaken for influenza.

INVESTIGATION OF WORKING CONDITIONS

The tripery, where these women worked, was situated in the meat market, which was associated with the cattle market and the abattoir. The area of ground covered by this building was in an industrial zone where numerous warehouses and stores were found and some offensive trades were carried on. It was served by an underground railway which formed a free passage-way for the migration of rats, and the market in general undoubtedly had a very great attraction for these animals. The tripery itself was a large ground-floor work-room with white-tiled walls. The floors were concrete and no double walls or partitions were present to give harbourage to rodents. The tripe-scrapers worked at wooden benches constantly flooded with water and the nature of their tasks exposed them to frequent minor cuts and abrasions. The floors, benches, &c., were also thoroughly hosed down every night after work and the general impression was of an exceptionally clean and well-managed establishment. There was, however, distinct evidence that rats were present in considerable numbers during the night and the market rat-catcher averred that the local rats held a sort of Parliament in the tripery after working hours. In consequence benches and floors were certainly contaminated with rats' urine and presumably with leptospiræ during that time.

Washings from benches and floors were examined for the presence of *L. icterohæmorrhagiæ* by the method suggested by Applemann (1934). Young guinea-pigs whose bellies had been shaved and scarified lightly were placed for one hour in buckets containing the washings heated to 32° C. A number died immediately from exposure, but the remainder showed no evidence of infection either in life or at post-mortem and their sera did not show the development of any antibodies to *L. icterohæmorrhagiæ*. Similar methods were used with success by Davidson and others (1934) but Schüffner states that experimental infection of guinea-pigs from such materials is difficult except in the presence of very numerous leptospiræ.

EVIDENCE OF INFECTION IN RATS

Twelve rats were caught by trap in the tripery itself; of these 5 were adult or young adults and 7 were very small. A positive sero-reaction was given by 9 to *L. icterohæmorrhagiæ* in dilutions ranging from 1 : 30 to 1 : 30,000. Antibodies were not found in the urine of any of these rats. Pieces of kidney were cultured in Schüffner's medium, suspensions of the same organ inoculated into guinea-pigs, and further portions retained for histology. *L. icterohæmorrhagiæ* was recovered in direct culture from two of the rodents and of the equivalent guinea-pigs one died with typical Weil's disease, the other was ill but recovered. The remaining guinea-pigs showed no definite evidence of infection, but the necessity of using immature animals for single tests was not appreciated at the time. Leptospiræ were found in Levaditi-stained sections of kidneys from 8 of the 9 rats serologically positive and were absent in those serologically negative. In the animals with high titres, all older rats, masses of leptospiræ were readily found, lying chiefly within the lumen of the convoluted tubules. Such rats must have been excreting very large numbers of organisms. Another two adult rats were obtained from the main market and both were positive by sero-reaction and by histology. Guinea-pigs were not inoculated and cultures, unfortunately, were contaminated. From these findings, however, it seems feasible to regard a positive sero-reaction in rats as evidence of infection.

DISCUSSION

The association of damp conditions with the presence of rats has again proved to be ætiologically associated with human leptospirosis. Such infections occur in Glasgow in the occupation of tripe-scraping in spite of the very good working conditions, but has not been recognised till the present. The degree of infection is difficult to assess. Many of the workers are seasonal and there is a continual drift from the employment, which means that a large number of people are exposed to risk for a short period. No record has been found, however, of any serious illness or death in recent years among such women.

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It is, of course, being increasingly recognised that jaundice is not necessarily evident in leptospirosis—Schüffner with his extensive experience records it in about 40 per cent. of all cases—and moderate and mild cases can readily be diagnosed "influenza" or "P.U.O." Of the 26 women employed as tripe-scrapers at the time of this investigation 5 showed evidence of present or past infection with *L. icterohæmorrhagiæ*; 2 of the 5 (Group B, Table II) must have been infected over twelve and fifteen years ago. The high incidence of positive sero-reactions in these older workers recalled temporarily is particularly interesting because the tripery was undoubtedly much more rat-infested at the time of their original employment there than it is now. Extensive alterations have been carried out in recent years, superfluous woodwork removed, floors concreted, &c., and although this has not prevented rats entering the building it must have limited their numbers considerably. The rat population is heavily infected, and although a steady campaign is carried out by trapping—poison cannot be used on account of the nature of the work—it is doubtful if the results will ever be quite satisfactory. Further precautions are now being taken particularly to eliminate possible overnight contamination of benches and floors before work is commenced in the morning and to deal with all cuts and scratches when they occur.

It is of interest, also, that the initial case recorded here occurred at a time when the concrete floor was broken in parts owing to structural alterations and the entry of rats made easier in consequence, and that symptoms developed about a fortnight after a fairly severe cut on the hand which would have facilitated the entry of leptospiræ.

Possible Occurrence of *Leptospira canicola* Infection

Leptospira canicola morphologically resembles the classical *L. icterohæmorrhagiæ* (Weil) strain, but can be distinguished serologically and so far as is known is carried solely by dogs. In these it produces a chronic renal infection often fatal but occasionally very mild and even symptomless. It is excreted in the urine. Human cases have been recorded in Holland; the organism has been recovered from the urine and positive sero-reactions of 1 : 1000 to 1 : 10,000 to *L. canicola* have been demonstrated (Roos and others 1937). A variable degree of cross-agglutination with *L. icterohæmorrhagiæ* (Weil) occurs but seldom leads to confusion and can be removed by absorption with the latter organism. *L. canicola* apparently does not affect the liver either in man or animals and jaundice, accordingly, is never seen. The actual illness is generally much milder than typical Weil's disease and no deaths have been reported; it may resemble influenza, occasionally with some meningitic symptoms, but is apparently very variable in character and impossible to recognise clinically (Schüffner 1934, Schüffner and Walch-Sorgdrager 1937, Roos and others 1937). Up to last October, 12 cases have been recorded in Holland (Schüffner 1938—personal communication) but so far as I can determine none in any other country. The possible case in my series was discovered in Group B of the tripe-workers (Table II). She was a healthy woman, aged 43, whose serum gave a positive sero-reaction to *L. canicola* in a dilution of 1 : 40 and was entirely negative to *L. icterohæmorrhagiæ* (Weil). Non-specific effect due to infection with the latter organism is ruled out by the absorption experiment shown in Table III. This was repeated twice with identical results. Further it has been shown by Smith and Davidson that non-specific sero-reactions do not occur in the absence of leptospiral infection; in their 403 control sera they were unable to demonstrate any agglutination or lysis either to *L. icterohæmorrhagiæ* or to *L. canicola* even in dilutions as low as 1 : 10. My own findings with about 200 sera are in entire agreement. In the present case the sero-reaction though in a low titre was very distinct and definite. Smith and Davidson instance a case of recognised Weil's disease in which the serum titre to *L. icterohæmorrhagiæ* fell from 1 : 1000 to 1 : 30 in little more than a year after initial illness, and

TABLE III—RESULT OF ABSORPTION EXPERIMENT

—	*L. icterohæmorrhagiæ.*	*L. canicola.*
Titre of untreated serum ..	0	1 : 40
Titre of serum after absorption with—		
(1) *L. icterohæmorrhagiæ*	0	1 : 40
(2) *L. canicola*	0	0

Schüffner records a titre of 1 : 300 to *L. canicola* only six months after infection. The persistence of such low-titre reactions for many years after Weil's disease is well recognised; I have found a positive titre of 1 : 300 in a person in whom a clinically typical Weil's disease occurred 28 years ago. Accordingly it is probably justifiable to assume that such findings will be common to all leptospiral infections. In this case the woman herself could remember no definite illness, but with a disease so protean in its manifestations this means nothing. (Smith and Davidson found evidence of leptospiral infection in 18 cases with no pertinent clinical history.) She had kept dogs in her home but could not remember any being ill. From what we know of *L. icterohæmorrhagiæ* infection, however, I feel that considerable evidence has been produced in favour of this woman having suffered at some time in the past from a clinical or subclinical infection with *L. canicola*.

A second specimen of blood obtained three months later was still positive to approximately the same titre, but this time the serum was clouded with lipoid material and the tests were difficult to read in low dilutions.

Summary

A case of leptospirosis, Weil's disease, in a tripe-worker is recorded and evidence is given of such infections having occurred in 4 out of 25 other tripe-workers. Of 14 rats caught in the building where cases occurred 11 showed infection with *L. icterohæmorrhagiæ*.

Evidence suggestive of *L. canicola* infection has been found in one human case.

I wish to thank Prof. A. W. Harrington, Glasgow Royal Infirmary, for the clinical details of the case recorded; Dr. A. S. M. MacGregor, medical officer of health for Glasgow, for arranging facilities for the investigation; Dr. T. McGowan of the public health department for his personal help; and the officials of the corporation markets department for their helpfulness and courtesy.

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TREATMENT OF PERIPHERAL VASCULAR DISEASE BY INTERMITTENT VENOUS OCCLUSION

A NEW, SIMPLE, AND INEXPENSIVE METHOD

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A method has recently been introduced by Collens and Wilensky (1936a and b) for the treatment of peripheral vascular disease by intermittent venous occlusion. In a subsequent paper (1937) they have described the results of this treatment in 124 cases.

The principle of the method depends on the increase in blood flow through a limb (reactive hyperæmia) which occurs immediately after a period of venous occlusion. Even though repeated circulatory occlusion and release may not increase the total blood flow through the limb over a given period of time the production of a series of waves of hyperæmia may be expected to increase the blood-supply to devitalised areas, and if sufficiently long continued to encourage the development of a collateral circulation.

The method devised by Collens and Wilensky consists in the production of venous occlusion for a two-minute period followed by a two-minute interval of circulatory release.

Their apparatus consists of an electrically driven pump fitted with an alternating mechanism and timing device. In patients suffering from peripheral vascular disease without ulceration or gangrene intermittent venous occlusion is continued for up to 12 hours a day, using an occluding pressure of 80–90 mm. Hg. When there is ulceration or gangrene, treatment is given during alternate hours, with intervening periods of rest, and an occluding pressure of 40–50 mm. Hg is used.

The results reported by these authors appear very encouraging. Their series includes cases of thrombo-angiitis obliterans, arterio-sclerosis (non-diabetic and diabetic), and embolism or thrombosis of a major artery to a limb. In a large percentage of cases they report marked improvement in intermittent claudication, the healing of gangrenous ulcers, and the relief of rest pain.

A wider adoption of this form of treatment is hampered by the following considerations:—

(1) The apparatus described by Collens and Wilensky is too expensive to be widely used, so long as the method is still in the experimental stage.

(2) The results of conservative treatment in peripheral vascular disease are so difficult to control that the claims of any new method of therapy meet with inevitable and not unjustifiable scepticism.

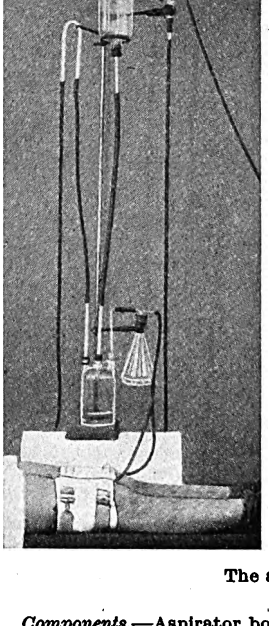
(3) In the great majority of cases of peripheral vascular disease we can hope for no lasting cure, and treatment must therefore be prolonged. This imposes a heavy burden on clinics where treatment of these patients is undertaken.

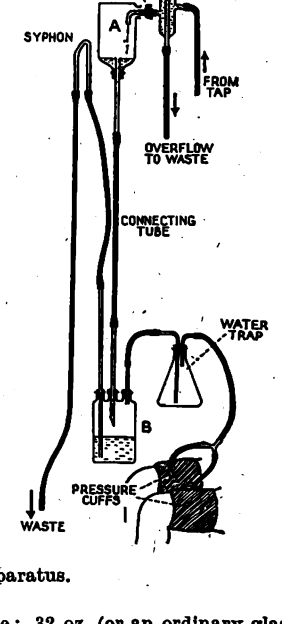
DESCRIPTION OF APPARATUS

The apparatus [1] described below is devised to meet these difficulties. It is inexpensive and can be constructed in any laboratory. It is simple in application and makes it possible for independent observers to investigate a large series of cases. Moreover it is comparatively silent in action, a factor of importance in a hospital ward. Finally it can be operated by the patient in his own home if running water is available.

Venous occlusion is produced by hydraulic pressure, intermittent action being brought about by an automatic syphon.

The apparatus (Figs. 1 and 2) consists of two reservoirs (A) and (B) between which runs a connecting tube. The upper reservoir is an aspirator bottle, the upper neck of which is left open and admits the delivery tube from the constant-level gauge. The lower reservoir is a Woulfe's bottle with which are connected a syphon, the top of which is level with the upper reservoir, its free end running to waste, and the water trap. The pressure cuffs are connected to the water trap. The constant-level gauge consists of an inflow tube which connects with the water-supply, an overflow which runs to waste, and a delivery tube, the rate of flow through which is controlled by a screw clip fixed on a rubber connexion.





The apparatus.

Components.—Aspirator bottle: 32 oz. (or an ordinary glass bottle with the bottom cut off may be used).
Woulfe's bottle: 32 oz.
Water trap: 1 litre conical flask.
Connecting tube: glass tubing and rubber tubing of 3/8 in. internal diameter. Any required pressure may be obtained by altering the length of the connecting rubber tube (and at the same time adjusting the length of the proximal limb of the syphon). The lower end of the connecting tube is ground obliquely to prevent the formation of an airlock in the bottle.
Syphon: glass tubing and rubber tubing of 5/16 in. internal diameter. The bend should be acute and flattened at the angle.
Cuffs: 5 in. wide. Upper border 18 in.; lower border (with entry tube) 16 in.
Connecting tubes to cuffs: 1/8 in. by 3/8 in. pressure tubing.
Constant-level gauge as illustrated; delivery tube into Woulfe's bottle 3/16 in. internal diameter.
The apparatus is mounted on a retort stand 56 in. high.

Mode of action.—Water is run through the constant-level gauge into the upper reservoir and then flows down the connecting tube into the lower reservoir. After the water level rises above the lower end of the connecting tube air is displaced via the trap into the pressure cuffs. When no further expansion is possible in the cuffs, water rises in the connecting tube and simultaneously in the proximal limb of the syphon. The pressure in the cuffs now rises rapidly until the connecting tube fills to the top. Thereafter the pressure rises very slowly until the upper reservoir fills to the level of the top of the syphon: at this point the syphon comes into action and the upper reservoir, connecting tube, and lower

[1] The apparatus (with one pressure cuff) is obtainable from Messrs. Baird and Tatlock, Cross-street, E.C.1, price £2 17s. 6d.

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reservoir all empty rapidly. A rapid fall in cuff pressure is thus brought about and the whole cycle starts again.

Adjustment.—The compression time is the interval between filling and emptying of the connecting tube. It can be increased or decreased by raising or lowering the syphon relative to the level in the top reservoir—e.g., if the syphon is lowered there is less filling of the upper bottle before the syphon comes into action and the compression time is shortened. The decompression time is the interval between emptying and filling of the connecting tube. It can be increased or decreased by lowering or raising the proximal syphon tube—e.g., if it is raised the lower bottle fails to empty completely and therefore fills more quickly and the compression time is shortened. Finally, it is possible by means of the screw clip to alter the rate of inflow and thereby lengthen or shorten the whole cycle. A fairly rapid rate of flow is desirable to ensure rapid filling of the connecting tube and to produce a pressure-head in bottle (A) sufficient to bring the syphon into action. Once the correct time intervals have been fixed for the apparatus, no subsequent readjustment is necessary—unless the number of cuffs is increased—since the constant-level gauge and control clip ensure the same rate of flow whenever the apparatus is in operation. The pressure within the cuff is determined by the difference in the water levels in the reservoirs after the connecting tube is full.

Water trap.—The purpose of the trap is to prevent water from being driven into the cuffs as the pressure rises. This precaution is particularly necessary if two or more cuffs are used. When the pressure falls, water syphons back from the trap into the lower bottle. The bottom of the trap must be level with the top of the bottle. If the trap comes into action the pressure within the cuffs is equal to the difference in the water levels in the trap and in the upper reservoir when the connecting tube is full.

WORKING INSTRUCTIONS

(1) It is essential for the proper working of the constant-level gauge that water should be continually running down the overflow tube.

(2) The outflow limb of the syphon should be as nearly as possible vertical throughout its length, the lower end being well below bottle (B) and clear of any obstruction to the outflow—i.e., it must not be coiled up in the sink.

(3) The cuffs must be applied firmly to the limb and fixed by a broad canvas band with buckles and straps (or by adhesive tape) to minimise expansion. They must not be tight enough to produce venous obstruction.

(4) If intermittent venous occlusion is to be applied to both lower extremities two large cuffs (18 in. by 5 in.) may be applied to the thighs and connected by a Y-piece. If two patients are to be treated at the same time, the right-angled outlet tube from the trap should be replaced by a T-piece. If however more than two cuffs are required a smaller size should be used to minimise expansion—e.g., sphygmomanometer cuffs may be used and applied below the knee. As several yards of connecting tubing may be necessary, fairly narrow bore, thick-walled rubber tubing must be used (see Components).

(5) After use the apparatus should be allowed to empty before it is turned off and the cuffs are removed.

(6) Should the syphon for any reason cease to act, the pressure tube to the cuffs should be disconnected to avoid the risk of prolonged venous occlusion.

RESULTS

During the last six months the apparatus we have described has been used in 10 cases of peripheral vascular disease; 8 of these were treated for intermittent claudication and 2 for gangrene of the toes. Our only modification of Collens and Wilensky's procedure has been to lengthen the decompression interval to 4 min., since flushing of the skin of the toes may take 1½–2 min. to develop after circulatory release in some cases.

Although the series is far too small to permit any definite conclusions, the results have been sufficiently encouraging to warrant further trial. All the patients with intermittent claudication have shown an increased walking capacity during treatment. As Collens and Wilensky point out however (1936c), there is a tendency for these cases to relapse after intermittent venous occlusion is discontinued. In patients with claudication, therefore, treatment at home is specially indicated and the daily duration of treatment should be regulated according to the degree of disability. If ulceration or gangrene is present, home treatment is inadvisable unless strict supervision can be exercised.

SUMMARY

A new form of apparatus is described for the treatment of peripheral vascular disease by intermittent venous occlusion. The apparatus is simple, inexpensive, and can be operated by the patient in his own home.

We should like to express our gratitude to Prof. Arthur Ellis, under whose direction these investigations were made.

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CORRECTION OF ALAR DEFORMITY IN CLEFT LIP

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THOSE who undertake the primary or secondary repair of cleft lips will be aware that one of the most difficult of the many deformities to cure is the flat or crumpled nostril and the distorted nose tip, which always occurs when the alar base on the cleft side is raised to its correct position and approximated to the columella. Many methods have been proposed for its cure, notably those of Blair and Brown (1931) and Gillies and Kilner (1932). The former depends on a complete separation of the flattened nostril and its implantation at a higher level; the latter involves a half-columellar shift upwards and medial rotation of the alar base by means of a transposed flap of skin. None of these methods, however, appears to me to strike at the essential anatomical basis underlying the deformity, which is an asymmetrical alignment of the lateral and alar cartilages in relation to the deviated septum and to the two layers of skin between which they lie. All of them have aimed at soft-tissue readjustment in order to camouflage the cartilaginous defect. The best that could be hoped for was a nose tip symmetrical from the front but not from below.

ANATOMICAL CONSIDERATIONS

In addition to the septum itself the cartilaginous framework of the nose consists of the two lateral expansions of the septum or lateral cartilages, which support the side walls of the nose in its middle third, and the two alar cartilages, which are responsible for the support of the tip and the even contour of the

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nostrils (Figs. 1 and 2). Any irregularity of these five cartilages either in shape or position is immediately reflected in a loss of external contour of the nose itself. Careful palpation of these supporting structures in the unoperated case of unilateral cleft lip (Fig. 3) shows that their normal symmetrical arrangement is grossly disturbed for the following reasons:—

FIG. 1.—Normal relationship of alar cartilages viewed from below.
FIG. 2.—Normal relationship of alar and lateral cartilages viewed from in front.

(1) Deviation and tilting of the septum to the sound side, produced by its attachment to the larger maxillary element, causes a definite displacement of the lateral cartilages and a tilting of the alar cartilages.

(2) Maxillary under-development on the cleft side allows the corresponding alar to be dragged downwards, outwards, and backwards and grossly upsets the cartilaginous symmetry of the two sides. On the sound side the cartilages will be found to be in reasonably normal position and the alar curve adequate, except for a certain amount of tilting due to the septal deviation. On the cleft side, however, the lateral and alar cartilages are displaced downwards upon the septum and columella, moderately in the case of the lateral cartilages, but considerably in the case of the alar cartilages. The amount depends upon the degree of underdevelopment of the underlying maxilla and on the severity of the septal tilt. The worse these features are—i.e., the wider the bony cleft—the greater the pull on the ala, and the flatter both it and the nose tip on that side will be. Thus the medial crus, the intercrural angles, and the vestibular vault on the cleft side are set at a lower level than the corresponding side, while the lateral crus, instead of being delicately curved towards the base of the columella, is quite flat across the cleft.

When, however, the primary repair of the cleft lip is carried out, a new series of deformities is produced entirely due to the operation. Approximation of the alar base to the septum and columella and equalisation of the alar basal levels do not by themselves raise the depressed intercrural angle or produce an outwardly curved nostril. The result is always a crumpled nostril with a deep depression just above the middle third of the lateral crus and with a corresponding fold of vestibular skin running from the vestibular vault obliquely downwards, backwards and outwards to the floor of the nose. If as so often happens the alar bases on the two sides have not been equalised or that on the cleft side sinks post-operatively, a further deformity makes its appearance. This is a gradual twisting forwards of the alar cartilage at its intercrural angle so that in addition to being set at a lower level it approaches the tip of the nose and so distorts the curve of the lobule and re-entrant angle of the nostril to produce a distinct angular droop on that side (Figs. 4, 5, 6).

The occurrence of these secondary defects that follow repair of the lip is to be explained as follows:—

The ala nasi consist of a central layer of inelastic cartilage sandwiched between and tightly adherent to two layers of skin. The outer of these is densely fibrous, inelastic, and thick; the inner is thin and rather more elastic. The ala on the sound side develops in the curved position, that on the cleft side in the flat. It is obvious that developmentally the relative positions of cartilages and skin must be different in each nostril. Any attempt to reproduce the gracefully curbed ala of the sound side by merely bending the flat ala on itself is certain to result in distortion unless the relationships of the cartilage and skin are permitted to alter for the new position. Owing to the tight and inelastic union between them this cannot occur naturally. But if the various layers of the cleft ala can be made to slide upon each other by other means then the entire structure should assume by itself a normal position.

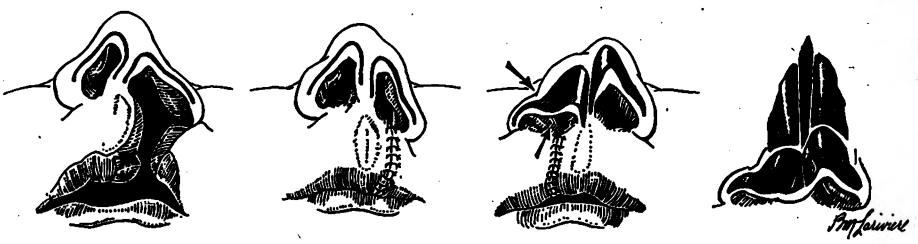

FIG. 3.—Cleft lip. Alar cartilage on cleft side depressed below that on sound side. Lateral crus flat, intercrural angle broad.
FIG. 4.—Repair of lip with alar base below level of sound side, secondary distortion of depressed alar cartilage.
FIG. 5.—Repair of lip with alar bases at same level. Twisting and secondary distortion of alar cartilage with skin fold internally.
FIG. 6.—Front view. Alar and lateral cartilages on cleft side depressed below level of those on the sound side. Nose tip distorted.

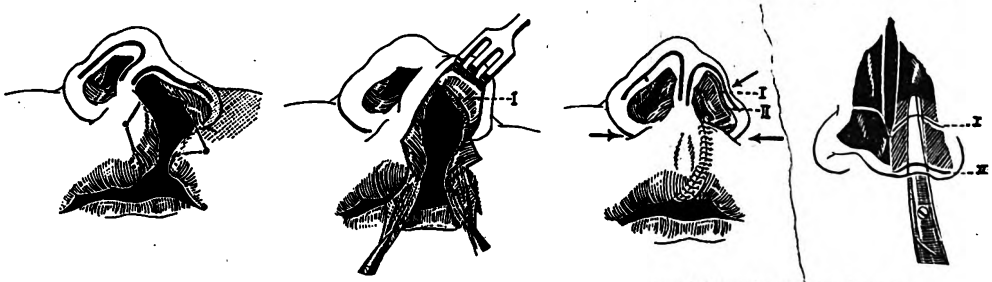

FIG. 7.—Repair of lip with undermining of alar base, and preparation of flaps for floor of nose.
FIG. 8.—Circumferential incision I, between alar and lateral cartilage with undermining of lateral cartilage along lower border.
FIG. 9.—Repair of nasal floor and ligament of alar bases. Circumferential incision II lower border of alar cartilage.
FIG. 10.—Undermining of alar cartilage to form "bucket handle" flap between incisions I and II.

This has long appeared to me to be the true explanation of the flat and crumpled ala and in support of it I present an operation which, by fulfilling these requirements, actually produces a symmetrical nose tip and a nostril on the cleft side indistinguishable from that on the sound side when viewed from any position.

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TECHNICAL DETAILS

Since the particular point of technique that aims at symmetry is simply a part of the repair or reconstruction of the cleft lip, it is unnecessary to refer to the operative details associated with the lip itself other than to lay the foundations for the alar repair.

It is assumed that the cleft has been pared, the lateral nasal and septal mucosal and skin flaps have been prepared for the floor of the nose and the alar base has been thoroughly mobilised by wide undermining and elevation of the tissues from the surface of the cleft maxilla (Fig. 7). At this point a vertical incision (Fig. 8, Incision I) is made in the skin lining the cleft ala between the lateral and alar cartilages extending from the cleft itself circumferentially round the vestibule across the vault and on to the septum along the upper border of the medial crus of the alar cartilage for one-third its length. In certain cases the lateral cartilage is undermined superficially for a short distance along its lower border (Fig. 8). The floor of the nose is now reconstructed and the alar base approximated to the septum and columella, care being taken to see that the level of the latter is identical in every respect with that of its fellow on the opposite side. The lip itself is then completely repaired in the usual way.

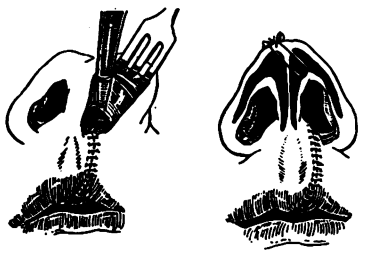

FIG. 11.—The "bucket handle" skin-cartilage flap from below.
FIG. 12.—Fixation of the alar cartilage after re-establishment of vestibular vault.

The uniform result of this is that in primary cases the typical crumpled ala is produced, while in secondary cases the already existing deformity is increased by raising the level of the alar base. The final correction of this deformity is as follows:—

With a No. 10 Bard Parker blade another circumferential incision (Fig. 9, Incision II) is made just within the edge of the ala and outside the lower margin of the alar cartilage beginning at the junction of the middle and lower thirds of the lateral crus and continuing round the re-entrant angle of the nostril on to the columella and along the lower edge of the upper third of the medial crus. A pair of fine curved blunt-pointed scissors (Fig. 10) or a No. 10 Bard Parker blade is then thrust through this lower Incision II, between the cartilage and the external skin and made to emerge into the vestibule through Incision I. The alar cartilage is then carefully separated from the external skin between the limits of these two circumferential incisions. In this way a "bucket handle" flap of almost the entire alar cartilage lined with vestibular skin is mobilised just inside the nostril attached medially to the upper part of the septum and columella and laterally to the alar base (Fig. 11).

As soon as this manœuvre is complete it will be found that the crumpled appearance disappears and the tip of the nose on the cleft side now freed from its attachment rises to its normal position, while the alar cartilage now free to rotate medially rises into the vestibular vault and reproduces the corresponding cartilaginous curve exactly. In the primary cases it is usually unnecessary to do more than this, fixation being quite superfluous. In the reconstruction of secondary cases, however, associated defects may now be easily remedied. Thus the droop at the re-entrant angle of the nostril produced by the twisting of the depressed cleft cartilage can be cured by rotating the "bucket handle" upwards, by excising a section of the lower border of the lateral cartilage previously undermined, to accommodate its upward shift, and by trimming a small section from the lower border at the intercrural angle to correspond with the other side. In a variety of ways symmetry of the alar can thus be assured. As a fixation in cases where much adjustment has been necessary, I am in the habit of inserting a mattress suture (Fig. 12) through the vestibular vault on the cleft side, bringing it out and tying it over a small dental roll placed over the intercrural angle of the opposite cartilage. This is removed on the fourth or fifth day. Occasionally a few lateral mattress sutures are used to secure the cartilage and skin in the new position and the edge of the nostril rolled in to correspond more exactly with the opposite side.

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GENERALISED OSTEITIS FIBROSA DUE TO A RETRO-ŒSOPHAGEAL PARATHYROID TUMOUR

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THE following case of generalised osteitis fibrosa due to a parathyroid tumour is recorded in order to emphasise the very advanced stage the disease may reach before being suspected, and the importance of making a thorough search for the parathyroid tumour if it is not found in the usual situation.

CASE REPORT

The patient was a girl, aged 19, who was admitted to St. Alfege's Hospital, London, on Dec. 8th, 1935, complaining of pain in the chest.

She had been quite well till about the beginning of the year, when her mother noticed that the end of the right clavicle was prominent. At the same time she began to get pain in the right arm, which left it numb, and she gradually lost the use of that arm. A reconstruction of the sternoclavicular joint was performed in the orthopædic department of another hospital in March, 1935, but following the operation she began to have pains in both arms and legs sufficiently severe to keep her awake at night. She had been unable to walk properly on account of pain and muscular weakness since the operation, and had noticed that her bones were slightly tender. In November she began to have pain on the left side of the chest, which was made worse by coughing, and was admitted for investigation. Apart from a poor appetite and constipation, there were no symptoms referable to other systems.

On examination she was found to be a pale, sallow complexioned girl, who was unable to stand alone. No definite physical signs were found in the chest, except slight lagging of the left side on respiration. Muscular power was generally very poor: she could only just lift her legs off the bed, and not at all against resistance. The bones were slightly tender on palpation. No abnormal physical signs were found elsewhere. The urine was normal, and did not contain Bence-Jones protein.

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Radiography (Dr. K. J. Yeo) of the chest on Dec. 10th showed several small rarefied areas in the ribs on the left side, and rather thin clavicles, with a ragged appearance at the outer end of the right clavicle; no evidence of disease was found in the lungs.

Subsequent X ray examinations on Dec. 13th and 23rd, with controls from a normal individual of similar age and stature showed general decalcification, certain bones being especially affected. The skull showed general mottled decalcification, with a few larger areas of rarefaction. The pelvis was funnel-shaped with general rarefaction. There were large cyst-like areas in the iliac bones and pubis, with a partial fracture of the right pubis, and irregular and delayed union at the epiphysial junctions of both ascending rami. Both humeri showed general mottled decalcification, with thinning of the cortex. The radius and ulna on the right side showed large rarefied areas just above the wrist. The 4th and 5th metacarpals on both sides showed cyst-like rarefaction. The leg bones, especially the tibiæ, showed severe decalcification, but no cysts were seen.

Chemical examination of the blood on Dec. 16th gave typical results—a high serum calcium and plasma phosphatase, with a low serum inorganic phosphate. A balance experiment over a three-day period showed a pronounced negative calcium balance (see Tables).

In view of these clinical and chemical findings the diagnosis of generalised osteitis fibrosa due to a parathyroid tumour seemed certain, notwithstanding the observations of Robbins and Kydd (1935) that some of these changes can be observed in other conditions. It was therefore decided to explore the neck and remove the tumour. The patient unfortunately developed a respiratory infection, and it was not possible to operate until Feb. 3rd, 1936, when a parathyroid tumour was found and successfully removed. The operative technique and description of the situations where parathyroid tumours are to be expected is described by Walton (1931); further references that should be consulted are Churchill and Cope (1934) and Lahey and Haggart (1935).

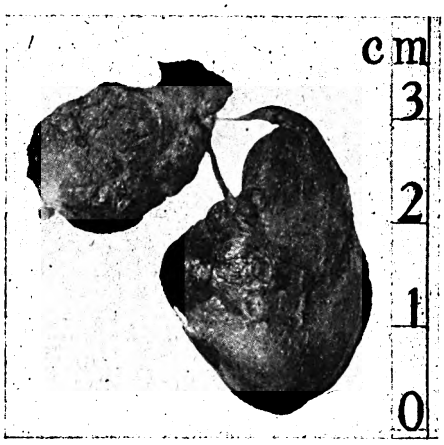

FIG. 1.—Parathyroid tumour (right) with small fragment of thyroid gland attached.

Operation.—Feb. 3rd. Gas-and-oxygen and avertin anæsthesia. The thyroid gland was freely exposed by means of a wide collar incision, but no parathyroid tumour was seen. The inferior parathyroid body of each side was identified and appeared to be normal. The superior bodies could not be identified on either side. A finger was passed into the thorax on either side of the trachea, but still no tumour could be found. The region behind the œsophagus was then explored, as described by Walton (1931). The thyroid fascia, which was a well-defined layer, was divided above the inferior thyroid artery: a finger was then introduced into the space behind the œsophagus, and a tumour was easily felt lying in the midline immediately in front of the last cervical and first dorsal vertebræ. The tumour was delivered into the wound without difficulty, only a few fine fascial strands requiring separation. It was connected to the postero-lateral aspect of the thyroid by a fine pedicle consisting of two small veins, a small artery,

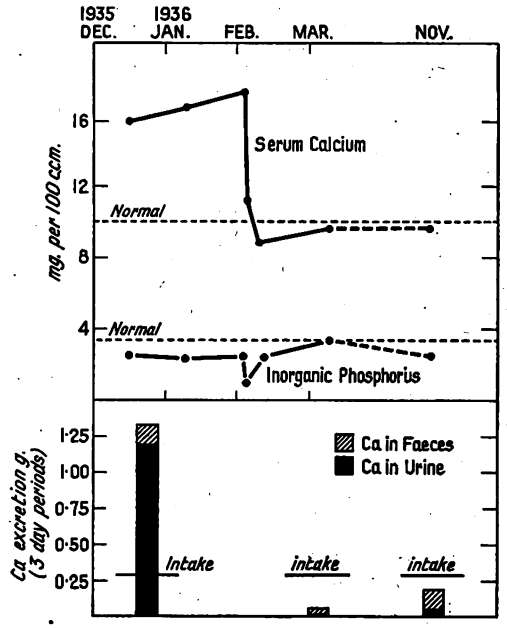

FIG. 2.—Changes in serum calcium and phosphorus, and calcium excretion before and after operation.

and a few strands of connective tissue. The tumour and a small piece of thyroid gland were removed and the wound closed with drainage. The tumour (Fig. 1) measured approximately 3 cm. by 2 cm., and was nearly 1 cm. thick; it was roughly oval and dark red in colour. The cut surface showed numerous areas of various shades of yellow.

Histological report (Dr. A. B. Bratton).—The gland is divided into ill-defined lobules by œdematous collagenous septa, which in places show a moderate infiltration with eosinophil leucocytes and a few polymorphs and plasma cells. The epithelial cells of the lobules are almost all alike in possessing a vacuolated slightly basophil cytoplasm and a spherical nucleus showing a fine chromatin net and one, or occasionally two, nucleoli; the vacuolation occasionally occupies the whole cell, the nucleus then appearing to be free in the centre of the empty cell, giving the usual appearance of a glycogen-loaded cell in formalin-fixed tissue. The cells resemble the principal cells of the normal parathyroid, but are mostly to some degree larger; in shape, size, and arrangement, however, they differ considerably in different parts of the tumour. In numerous areas cuboidal cells only slightly larger than the normal are arranged in small acini divided by capillaries; the capillary network is much less conspicuous than in the normal gland. The majority of the acini are solid, but tubular acini, either empty or containing pale eosinophil colloid-like material, are not infrequent. Occasionally the tubular acini are lined with larger, columnar, completely vacuolated cells, usually in a single row but in places two or three deep; such acini tend to occur in small groups. There are a few small areas, usually in relation to the first-named, in which the cells vary considerably in size but are all considerably larger than the normal, many having hyperchromatic nuclei. In other areas the cells are arranged in large strands, often anastomosing, which lie in an œdematous young collagenous stroma showing a few young fibroblasts and an infiltration of the same character as in the large septa but slightly greater in degree. The outer margin of the strands

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is formed by a layer of columnar cells; in the majority the central part is formed by a solid mass of cuboidal cells, but in others the strands form large irregular tubules, the largest being lined with one to three layers of columnar cells, the smaller tending to show more layers. In one area there are a few small clumps of large cells with pale eosinophil cytoplasm, resembling the pale eosinophil cells of the normal gland. There are a few areas of hæmorrhage. The structure varies so much from that of the normal gland that it might be considered neoplastic, and indeed in places suggests a carcinoma, though there is no definite evidence of infiltration; no normal parathyroid tissue is however present, which would be expected in the case of a true adenoma. The picture indicates an extreme degree of activity and is comparable to the areas of atypical proliferation sometimes found in an over-active thyroid. The condition may be described as adenomatous hyperplasia of the parathyroid.

Progress.—The day after operation the patient complained of stiffness of the face and tingling in the limbs. Tetanic symptoms, with positive Chvostek and Trousseau signs, persisted for approximately

TABLE I—BIOCHEMICAL FINDINGS

Date.	Serum (mg. per 100 c.cm.).					Plasma phosphatase (units per c.cm.).
	Ca	Mg	Na	K	P	
Dec. 16th, 1935	15·5	..	..	..	2·3	1·1
Jan. 10th, 1936	16·4	1·9	..	..	2·15	..
Feb. 3rd, 1936	17·3	2·0	310	19·6	2·35	..
Operation (Feb. 3rd)						
Feb. 4th, 1936	11·3	1·8	297	20·3	1·1	..
„ 7th, 1936	8·7	..	..	..	2·2	..
March 6th, 1936	9·5	..	..	..	3·4	0·75
Nov. 24th, 1936	9·6	..	..	..	2·3	..
Dec. 2nd, 1936	..	..	..	..	..	0·56
Jan. 4th, 1937	9·5	..	..	..	2·5	..

TABLE II—BALANCES

Date (all 3-day periods).	Calcium (grammes).				Phosphorus (grammes).			
	Int.	Output.		Bal.	Int.	Output.		Bal.
		Ur.	F.			Ur.	F.	
Dec. 20th-23rd, 1935	0·30	1·20	0·16	−1·06	1·50	1·95	0·12	−0·57
March 4th-7th, 1936	0·27	0·01	0·05	+0·21	1·30	0·68	0·15	+0·47
Dec. 8th-11th, 1936	0·27	0·05	0·13	+0·09	1·36	1·16	0·18	+0·02

Int. = intake; Ur. = urine; F. = fæces; Bal. = balance.

10 days after the operation. Convalescence was somewhat delayed owing to a severe respiratory infection, but 18 days after operation she was able to walk with assistance, and in 25 days alone. Her muscular power had greatly improved by this time, and though she complained of some pain on walking 6 weeks after operation, her general condition was vastly improved from that on admission. She was discharged from hospital on March 19th. She was admitted again for observation in November, 1936: there was still slight pain in the legs on walking for some time, but this disappeared after a few days' rest in bed, and was attributed to the greatly increased use of her muscles since the operation. She attended the out-patients' department in January, 1937, and was then completely well.

BIOCHEMICAL FINDINGS
(see Fig. 2 and Tables I and II)

The serum calcium and phosphorus figures were typical of the condition. The first serum calcium figure was 15·5 mg. per 100 c.cm., rising to 17·3 mg. on the day of operation. Following operation, the level dropped to 11·3 mg. the next day and 8·7 mg. 3 days later. It remained subsequently practically constant at 9·5 mg. per 100 c.cm. The plasma phosphatase was very high (1·1 units per c.cm. by the original Kay method, which has a normal range of 0·1 to 0·2 unit) before operation, and was still above normal (0·56 unit) nine months after operation.

The serum inorganic phosphate was low throughout, except for one post-operative value of 3·4 mg. per 100 c.cm. The extremely low value of 1·1 mg. was observed on the day after operation.

Calcium and phosphorus balances were both markedly negative before operation. A month after operation there was intense retention of calcium, it being almost absent from the urine. Nine months later the calcium and phosphorus balances were normal.

The other serum kations were also determined before and after operation. There was a slight fall in the serum sodium after operation, probably due to shock, but no significant change in potassium or magnesium. There are no records of serum potassium figures after operation in parathyroid tumours, but there was no significant change in serum potassium when 80 units of parathormone were injected intravenously in a patient with periodic paralysis (Allott and McArdle 1938), although as shown by Ellsworth and Nicholson (1935), and confirmed by us, a large amount of extra potassium is excreted in the urine. Aub and Tibbetts (1937) found a slight fall in serum magnesium after operation in one case, with significant changes in the magnesium excretion. Potassium and magnesium balance studies were not carried out in this patient.

The blood chemical methods used were the same as those described in previous papers by one of us (E. N. A.). For the balance experiments the patient was placed on a measured low-calcium diet for 4 days, and then excretion was measured over a single further period of 3 days, the beginning and end of the fæcal collections being marked by carmine.

SUMMARY

A case of generalised osteitis fibrosa due to a retro-œsophageal parathyroid tumour is described. The patient had been operated on nine months previously at another hospital, where the disease was not suspected; although there was no obvious external deformity, X ray examination showed very widespread decalcification and cyst formation in numerous bones. Typical metabolic changes were found; after operation calcium and phosphorus metabolism returned to normal.

Our thanks are due to Sir Frederick Menzies, medical officer of health, and to Dr. B. A. Young, medical superintendent of St. Alfege's Hospital, for permission to publish this case.

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MEMORIAL EDITION OF PAVLOV'S WORKS.—Soon after the death of Prof. Ivan Pavlov the Soviet Government decided to publish a complete memorial edition of his works, in four languages—Russian, English, French, and German. The first two volumes will be issued this year. The former will contain Pavlov's articles and speeches on social and political subjects and his work on blood circulation; the second will be devoted to his observations on the physiology of digestion.

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TYPHOID EMPYEMA
FORTY YEARS AFTER ENTERIC FEVER

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SENIOR DEMONSTRATOR OF PATHOLOGY IN THE MEDICAL COLLEGE

EMPYEMA due to *Bacterium typhosum*, occurring forty years after the acute attack of enteric fever, is thought to be sufficiently unusual to justify a record of a case, together with the bacteriological findings.

CASE REPORT

A salesman, aged 54, was admitted to St. Bartholomew's Hospital under the care of Dr. F. G. Chandler on May 25th, 1937. He had always been a strong and healthy man, but remembers having had an illness in 1896, which he believes to have been typhoid fever. During the late war he had a slight attack of malaria. Two years ago all his teeth were removed on account of pyorrhœa. His general health was good.

On May 1st, 1937, he had "pleurisy" on the right side, with fever to 99° F. On May 10th the pain in the chest became more severe. Temperature 101° F., with sweats; cough, but no sputum. A week later there were signs of a pleural effusion at the right base. His doctor aspirated 15 c.cm. of clear fluid.

On admission he was flushed and looked ill. Temperature 100°–101° F. There were signs of a moderately large effusion on the right side of the chest. He had a slight cough but no sputum. There was considerable glycosuria but no albuminuria.

Treatment and progress.—May 25th: White cell count, 13,400 per c.mm.; 20 c.cm. of turbid fluid withdrawn from the right pleural cavity. June 1st: White cells, 16,000 per c.mm. (polymorphs 13,020, lymphocytes 2436, mononuclears 1092, eosinophils 252); blood-sugar, 1½ hours after a meal, 242 mg. per 100 c.cm.; 50 c.cm. of thin pus withdrawn from the chest. June 8th: White cells, 11,200 per c.mm.; insertion of intercostal catheter under Evipan anæsthesia; 250 c.cm. of pus drained; temperature returned to normal for a few days.

On June 12th, because the tissues around the catheter had become brawny and œdematous, and the amount of pus draining had fallen to 20 c.cm. a day, a rib resection was performed under general anæsthesia. A large tube was inserted and the surrounding tissues were opened up. Daily wash-outs with Dakin's solution were begun, and the temperature dropped to normal in the course of a few days. He remained afebrile until his discharge. The pus, which averaged 100 c.cm. daily for the first fortnight after the rib resection, diminished rapidly after this, and by July 1st was a mere trace. He was discharged from hospital on July 24th with a small tube in the wound, and this was removed on August 14th, the wound finally healing on Sept. 1st. He has regained 3 st. in weight and is now in perfect health.

In view of the glycosuria and hyperglycæmia, he was given 30 grammes of glucose and 30 units of insulin before the operation for rib resection. On a diet of carbohydrates 130 g., protein 70 g., fat 90 g., and 10 units of insulin twice daily, he became sugar-free in the course of a few days. His diet was subsequently increased to carbohydrates 150 g. and on discharge he was sugar-free without insulin. The urine has been tested on several occasions since then and no sugar was found.

BACTERIOLOGICAL FINDINGS

The first specimen of pleural fluid withdrawn was thin pus (May 25th), but no organisms were seen in films (Gram or Ziehl-Neelsen). Culture of a loopful yielded four colonies of a coliform bacillus, which was shown to have the biochemical characters of *Bact. typhosum*, and to be agglutinated to full titre by a typhoid serum. The second specimen (May 31st) contained 31,000 leucocytes per c.mm., nearly all polymorphonuclears, but no organisms were seen in films. The same organism was again grown. The third specimen was similar. Only three colonies were grown from a large (4 mm.) loopful.

In view of the unusual nature of the case, it was thought desirable to confirm the identity of the organism, so an agglutinin-absorption test was carried out, but satisfactory absorption was not obtained. (The titre of the serum to *Bact. typhosum* was reduced to 25 per cent. of its original value.)

The organism was therefore sent to Dr. A. Felix, who has kindly allowed us to make use of his findings. He suggested that since the culture used contained a good many non-motile organisms, the reason for the failure might have been an insufficient quantity of "H" antigen in the absorbing suspension. The Table, abbreviated from Dr. Felix's report, shows the results of agglutination tests with the patient's strain, compared with those obtained with a strain known to be rich in "Vi" antigen and also with a strain that is devoid of this antigen.

AGGLUTINATION TESTS

Strains.		"Watson" O-inagglutinable. Virulence high.	Patient's	H.901 O-agglutinable. Virulence low.
Pure H serum	1 in 2000	++	+	++
Pure O "	1 in 1000	(+)	++	+++
	1 in 5000	−	+	+++
Pure Vi "	1 in 100	+++	+++	−
	1 in 400	++	+++	−

Dr. Felix also examined the patient's serum for agglutinins and found the result to be:—

Vi titre against strain "Watson"	1 in 20+
O titre against strain O.901	1 in 100±
H titre	1 in 200±

He stated that the Vi titre of 1 in 20 was quite significant, and of the same order as the titres found in chronic typhoid carriers. The organism was not recovered from the patient's fæces, urine, or from the duodenal contents.

A further examination of the pus from the wound on July 8th showed a heavy growth of *Streptococcus pyogenes*, but *Bact. typhosum* could no longer be grown.

It is thought that the empyema probably resulted from a typhoid osteitis of a rib, but there was no radiological evidence of this.

We are indebted to Dr. F. G. Chandler for permission to publish this case, and to Prof. L. P. Garrod for his helpful criticism and advice.

SAFETY BOOTS.—An inquiry recently carried out in 56 Sheffield firms on behalf of the National "Safety First" Association showed that foot injuries accounted for 14 per cent. of the non-fatal accidents to the workmen. A considerable proportion of these could have been avoided by the use of a safety boot with a hardened toe-cap which would withstand a heavy weight. The British Standards Institution has been asked to draw up a suitable specification for such a boot, and will probably lay down that the toe-cap must not collapse when the maximum weight which a man can carry—about a hundredweight—is dropped upon it from the wearer's hands. It is hoped that the adoption of a standard for safety boots will encourage their general use.

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MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTIONS OF SURGERY, MEDICINE, AND ANÆSTHETICS

AT a joint meeting of these sections held on March 2nd, Prof. G. GREY TURNER presiding, a discussion took place on

Massive Collapse of the Lung as a Complication of Surgical Operations

Mr. C. PRICE THOMAS said that atelectasis had been recognised as an entity for nearly a hundred years. W. T. Gairdner in the middle of the last century had demonstrated the morbid anatomy of the condition, suggesting that it was caused by retained secretions. Interest seemed to have faded until W. Pasteur (1908) put forward the hypothesis that the cause was diaphragmatic paralysis. In 1914 Elliott and Dingley revived Gairdner's theory, which had since been supported by experimental and clinical observations. Mr. Price Thomas regarded the re-expansion of the lobe after removal of the secretion as evidence that any secretion found occupying the bronchus of an atelectatic lobe was a cause and not a result of the collapse. Bronchial occlusion was probably not the only cause of collapse, as it did not explain about 10 per cent. of the cases. Atelectasis artificially produced by bronchial occlusion took about six hours to become established. The cases of sudden onset occasionally met with thus could not be due to occlusion. Rose Bradford's neuromuscular theory might provide an explanation of these cases; little was known of the neuromuscular mechanism of the lung. L. Brauer noticed quiescent segments of the bronchial tree during quiet respiration. This might have some bearing on the production of lobular collapse when taken together with the discovery of R. M. Waters that hyperventilation with carbon dioxide is followed by an abnormally high rate of diffusion of gases if the bronchus is occluded.

In the 90 per cent. of cases of atelectasis following operation the factors underlying obstruction were (1) the characteristically thick and tenacious secretion, and (2) the patient's inability to expel it. The bronchial glands were sero-mucous and in catarrhal affections—as after atropine or hyoscine—the serous secretion was inhibited more than the mucous. The same effect was produced by irritation from the inhalation of material such as blood clot or dental tartar. Pain and lack of muscular power diminished coughing, which was the best natural expulsive mechanism. The result of many investigations showed that the type of anæsthesia used was not important, although the combination of spinal and ether anæsthesia showed a higher rate than either alone. Preliminary narcotisation predisposed a patient to aspiration into the tracheobronchial tree. Abdominal operations showed a higher incidence than those in other regions, and operations on the upper abdomen and appendicectomy with drainage the highest incidence of all, especially in adult males; this was due to deficient diaphragmatic respiratory movements owing to pain. Infection of the bronchial tree, however slight, played an important part in the ætiology of the condition and this had a bearing on oral sepsis. Males were more prone to the complication perhaps because they were more dependent on abdominal breathing. Post-operative atelectasis generally occurred within the first 48 hours, although it might be delayed for a week. The onset was usually rapid and accompanied by a rise in pulse-rate, temperature, and respirations. Pain was usually present and sometimes severe; cough and respiratory distress of varying degree were constant features. Sputum was not usually present. The classical physical signs were dullness on the affected side with displacement of the heart to that side; the diagnosis was confirmed by X rays. Prophylaxis depended on recognition of the factors predisposing to the condition; treatment should be directed towards removal of the obstruction by stimulating the cough. Mr. Price Thomas did not advocate bronchoscopic aspiration as a general rule, expectorants being usually sufficient. In his view the administration of carbon dioxide and oxygen was of doubtful value, perhaps even undesirable, as it might result in the aspiration rather than the excretion of the mucous plug.

Dr. JAMES MAXWELL said that Pasteur's conclusions were supported by the evidence obtained during the war, reviewed by A. B. Soltau (1925). During the last ten years the conclusive demonstration that spontaneous massive collapse is due to retention of secretion with consequent bronchial obstruction had been furnished by the bronchoscope. Many factors are concerned in the production of this obstruction. M. C. Myerson had shown the importance of a protective cough in keeping the bronchial tree free from secretions, and also the tolerance of the tracheal and bronchial mucous membrane to certain material. Pre-operative medication with morphia and other respiratory depressants was therefore contra-indicated. Inability to expel a plug of mucus was the chief cause of massive collapse. That diaphragmatic paralysis alone was not the main cause in collapse of the lower lobe was proved by its rarity after phrenic evulsion. The raising of the diaphragm in established cases Dr. Maxwell regarded as secondary. In the early stages symptoms were few or lacking; later came an irritative cough, with little or no sputum, and rarely any trace of blood. A common feature was pain in the chest (which might be mistaken for pleurisy) due to sudden increase in the negative tension in the pleural space. There was always some dyspnœa. A rise of temperature, when it occurred, was apparently due to the retention of infected material distal to the obstruction and therefore suggested the possibility of developing suppuration in the collapsed area. The earliest and most important physical sign was the weakening of the breath sounds over the affected lobe; when the diagnosis is made at this stage preventive treatment might well be successful. In the fully developed condition diagnosis was not difficult, even without radiological help. The chief danger of post-operative collapse lay in its possible sequelæ—lung abscess and bronchiectasis. It was thus essential to secure re-expansion as early as possible. Every effort should be made to eliminate factors predisposing to retention of secretion. In the earliest stage of collapse inhalations of carbon dioxide were of great value. When collapse had occurred and the patient was unable to expel the obstruction by coughing, bronchoscopic aspiration should be done early rather than late.

Dr. E. H. RINK said the anæsthetic might be one among the factors leading to the condition; he personally thought that the nature of the patient and the operation were more important. In estimating the chances of collapse in any particular patient four points must be borne in mind: most of the cases

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were males and followed abdominal operations, and the risk increased with age, asthenia, and an unhealthy condition of the respiratory system, including oral sepsis. The selection of a suitable time for the operation (*not* the day after admission to hospital or nursing-home) was more relevant than that of any special anæsthetic. Skilful administration and gentle operating were desirable, and after the operation tight bandaging should be avoided and the patient should be encouraged to move about and cough. Atropine increased the viscidity of the sputum, making coughing more difficult. Carbon dioxide should be used quite early in small quantities or only as a last resort. Post-operative administration of morphia in small doses helped the cough by deadening pain. Expectorant drugs did not help much in this condition.

Dr. E. H. JOULES described two cases not due to bronchial obstruction. Both had started with peritonitis which had gone on to mediastinal pleurisy, involving the phrenic nerve with resulting diaphragmatic paralysis.

Dr. RANYARD WEST working on rabbits and other animals had found that curarine can produce a sudden collapse of the lung which was thought to be due to paralysis of the bronchial as well as of the voluntary musculature. The intrapleural pressures in rabbits and cats, before and after arrest of respiration had been induced with ether, were similar to those following the injection of curarine. Posture was a factor in animals. When the head was down and the abdominal contents pressed on the diaphragm, a lower negative pressure occurred than when the head was up, but this observation might not be applicable to man, whose diaphragm was much more muscular. Pulmonary collapse during the instillation of lipiodol was analogous to a similar type of collapse which occurred in small animals, such as the guinea-pig, when blood was allowed to enter the bronchial tree. Dr. West had noticed that curarine did not so easily produce massive collapse when the animal had been atropinised.

Dr. LEONARD FINDLAY commented on the incidence of spontaneous pulmonary collapse in children.

Mr. JOHN HUNTER said that the pre-operative use of atropine—a survival from the days when open ether was the customary anæsthetic—might cause the formation of a tenacious plug of mucus. Morphia probably did no harm as it allowed of more gentle handling of the patient. Cases occurring in the first 24 hours after operation, which perhaps physicians did not often see, could generally be cured by giving carbon dioxide; in cases occurring at a later date other factors were involved, possibly sepsis.

Dr. LETHEBY TIDY said that during the war he had seen many cases in which there was no previous history of pulmonary sepsis; these might have been due to a neuromuscular phenomenon. He had also seen massive collapse in diphtheria, perhaps as a result of muscular weakness. Many cases of contralateral collapse had been recorded, mostly following quite minor thoracic injuries; possibly the condition of extreme strain under which the men had been living predisposed them to shock.

Prof. G. GREY TURNER said that the modern anæsthetist provided excellent operative conditions; that the subsequent state of the patient was often less satisfactory was perhaps chiefly due to premedication. The more restless and active post-operative patient of former days may have had more pain, but he also had more cough. Morphia should only be given if there was real pain or distress, and cough should be encouraged.

REVIEWS AND NOTICES OF BOOKS

An Introduction to Bacteriological Chemistry

By C. G. ANDERSON, Ph.D. Birm., Dip. Bact. Lond., Lewis Cameron Teaching Fellow, Bacteriology Department, University of Edinburgh. Edinburgh: E. and S. Livingstone. 1938. Pp. 278. 10*s.* 6*d.*

THE scope of this book, which is the first to reach us with a claim to be a text-book in this special field, is somewhat wider than its title indicates, since it includes also some aspects of the biochemistry of yeasts and lower fungi. This illustrates at once the difficulty of confining a text-book to a specific aspect of biochemistry; it is becoming more and more clear that there is no biochemistry peculiar, for example, to mammals, or to bacteria or yeasts, but that there is a fundamental biochemical unity based on the organic relationships of all forms of living matter.

Dr. Anderson has designed his book for the use of students taking such courses as the diploma in bacteriology of the University of London, or the honours course in bacteriology in the University of Edinburgh; that is to say, advanced courses which deal extensively with the biochemical aspects of bacteriology as well as those more directly medical. One of the problems to be faced by the author of such a text-book lies in deciding what knowledge may be assumed in its potential users. For example, in the first part of this one eighteen pages are devoted to hydrogen-ion concentration and oxidation-reduction potentials, nine pages to colloids and adsorption, and sixteen pages to enzymes. These complex subjects can hardly be covered even superficially unless the reader is credited with a certain basic knowledge of them; and if on the other hand he has had a sound training in chemistry this section is superfluous. This criticism gains force from the consideration that a good knowledge of organic chemistry is necessary to the understanding of the subjects dealt with in the remainder of the book, and no preliminary summary on organic chemistry is supplied. The second part of the book on metabolism includes chapters on the nutrition of autotrophic and heterotrophic bacteria, growth factors, adaptive and constitutive enzymes, bacterial respiration, nitrogen and carbohydrate metabolism, alcoholic fermentation (by yeasts), fermentation products of the lower fungi, and industrial fermentations. There follow chapters on the proteins (including a section on nucleic acids), polysaccharides, lipoids, and pigments of micro-organisms. Some aspects of immunochemistry are discussed in a third part, which contains a chapter on antigens, haptens, antibodies, and complement, and one on the mechanism of antigen-antibody reactions. Methods for the isolation and identification of metabolic products are described in a short appendix.

The ground covered by the book is thus very wide and the collection in one slender volume of so much information about the rapidly developing subject of microbiological chemistry is certainly an achievement. The author has not managed to escape a certain lack of correlation between various parts of the book and the presentation of some subjects (e.g., growth factors) is not always satisfactory. The classification of bacteria based on their supposed requirements of "vitamin B" is valueless; surely

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it is no longer permissible to talk of "vitamin B" when aneurin (vitamin B_1), lactoflavin (vitamin B_2), and, probably, nicotinic acid, are already known as components of what used to be lumped together as the vitamin-B complex.

There is in places evidence of a failure to digest all the material that is being expounded and of uncritical acceptance of some of it, resulting in more dogmatic presentation than is desirable in a text-book for advanced students. Many of the statements need modification or qualification; some are even misleading. The omission, among the suggestions for further reading, of references to selected original papers will diminish the value of the bibliography which is concerned almost exclusively with other books or reviews.

1937 Year Book of Dermatology and Syphilology

Edited by FRED WISE, M.D., Professor of Clinical Dermatology, New York Post-Graduate Medical School; and MARION B. SULZBERGER, M.D., Assistant Professor of Clinical Dermatology at the School. Chicago: The Year Book Publishers; London: H. K. Lewis and Co. 1938. Pp. 736. 12*s.* 6*d.*

THIS year book continues to be a mirror of the scientific progress made during the year. It enables the conscientious physician practising the specialties covered to keep abreast of modern advances without more effort than is involved in reading a single volume. Among the more important papers epitomised are those dealing with the occupational dermatoses, neuropathic eczema, viruses in the ætiology of skin diseases, dietetic treatment of neurodermatitis, treatment of kraurosis vulvæ, reciprocal relations between the liver and skin, the pathochemistry of seborrhœa, and differences of radiosensitivity of skin glands. Following their custom the editors have expressed in footnotes their own views, sometimes critical and always stimulating, on many of the contributions selected for notice. They have themselves contributed, as in former years, an article on treatment as a "guide for the general practitioner." This one, on the treatment of common fungous affections, should not be neglected even by the experienced dermatologist. There is no more useful publication in the whole realm of dermatological literature, and we trust that its issue will continue to be under the able guidance of its present editors for many years to come.

Pre-Natal and Post-Natal Management

By J. ST. GEORGE WILSON, M.C., M.B., Ch.M., F.R.C.S., F.C.O.G., Hon. Obstetric and Gynæcological Surgeon, Royal Infirmary, Liverpool; Consulting Obstetrician, Walton Hospital, Liverpool; Lecturer in Clinical Obstetrics and Gynæcology, University of Liverpool. London: Edward Arnold. 1937. Pp. 206. 10*s.* 6*d.*

A SMALL book always tends to find favour with practitioners and students who know from experience that one twice the size does not necessarily contain double the information, although it may give much more detail. There is some evidence of undue compression here (post-natal management occupies fifteen pages and toxæmias of pregnancy only twelve), but the doctor unable to find much time for professional reading will certainly derive benefit from Mr. Wilson's wise advice. He draws special attention in his preface to the tendency to neglect the general systemic condition of the patient from an undue regard for the state of her pelvis. The attempt, however, to include in this little book some account of general medical diagnosis and treatment is not very successful; the management of acute and sub-acute phthisis in the pregnant woman cannot be effectively summarised in 26 lines.

On one or two points the author differs from the main body of current opinion. He advises against abdominal evacuation of a hydatidiform mole under any circumstances, recommends unconditionally chloroform to control eclamptic convulsions, and goes too far, in our view, in saying that "according to the modern theory of water intoxication, the retention of water in the tissues either as a result of, or in any case in association with, pregnancy negatives the unlimited ingestion of water." His advocacy of parathyroid extract with calcium not only in cases of peripheral neuritis but also in chorea, asthma, and for the attacks of faintness and giddiness which commonly occur is hardly in accord with modern practice.

The drawings and photographs which illustrate this book are excellent and on the whole the advice given is sound.

Diseases of Women

Sixth edition. By Ten Teachers. Edited by CLIFFORD WHITE, Sir COMYNS BERKELEY, and FRANK COOK. London: Edward Arnold. 1938. Pp. 492. 18*s.*

"Ten Teachers" will continue to be popular, for the combined authorship and editorial committee go far to overcome one of the student's great difficulties—the diversity of opinion among professors and lecturers. Here is to be found information which at least ten senior specialists have agreed upon, and the student can feel that he treads on firm ground. In this edition the section on the physiology of menstruation has been brought up to date, with a short but clear account of our knowledge of pituitary and ovarian hormones; this includes a statement on the units in use, and the trade names of some of the better known preparations. A brief chapter has been added on the methods of contraception and sterilisation, an aspect of the subject which has increasing importance in actual practice. The chapter on neurasthenia and neurosis in relation to pelvic disorders strikes us afresh as a most valuable feature of a work which gives a comprehensive account of the diseases of women, well set out and adequately illustrated.

Applied Mycology and Bacteriology

By L. D. GALLOWAY, M.A. Cantab., Imperial Mycologist, New Delhi, 1934–1937; Mycologist to British Cotton Industry Research Association, 1927–1934; and R. BURGESS, M.Sc., Ph.D. Lond., Dairy Bacteriologist to Lancs County Council; Microbiologist to British Woollen Industry Research Association, 1927–1935. London: Leonard Hill. 1937. Pp. 186. 10*s.*

WITHIN its scope this is an excellent and interesting little book and one very suitable as an introduction to microbiology for anyone with a sound scientific training. Though brief and clear, it is not in any sense a "popular" work. The chapters are composed in an accurate and scholarly way, and the list of references at the end of each chapter is well chosen. Any young bacteriologist will find it worth reading; it will give him a broader outlook on his subject, emphasising just those parts of which he learns little or nothing from his medical books. Even mature

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bacteriologists would, we think, enjoy the informative chapters on the textile and fermentation industries. Should a further edition be called for, we suggest that the chapter on hygiene and medicine be omitted. It is quite impossible even to sketch so vast a subject in so small a space. The chapter on agricultural applications might be extended with advantage, and a fuller account of soil fertility in relation to microbiology would be welcome.

Bec-de-lièvre

Formes-Cliniques-Chirurgie. By VICTOR VEAU, avec la collaboration de JACQUES RÉCAMIER. Paris: Masson et Cie. 1938. Pp. 326. Frs.100.

THIS book on hare-lip represents the experience of a surgeon who has operated on over 1200 patients. He has examined all the many aspects of the problem in a logical sequence and set out his conclusions with precision. He first describes and classifies the various types of hare-lip and then reviews the older methods of treatment before giving an account of the experimental work which led to the elaboration of the operation he now performs. Each of the four types of hare-lip is discussed separately and four operations are minutely detailed. Operations on the lip, unlike those on the palate, are judged by two standards, the functional result and the cosmetic appearance. It is of the latter, the appraisal of which is a personal factor, that Veau says ruefully: "Mais qui est satisfait de la forme de son visage?"

The book is illustrated with such profusion that it would be quite intelligible to a reader who knows no French; the various operations described are shown stitch by stitch and step by step. There is likely to be as wide a demand for this work as for its companion-volume on cleft palate.

Sir Kenelm Digby

By JOHN F. FULTON, M.D. New York: Peter and Katharine Oliver. 1937. Pp. 75.

THIS brochure is a reprint with some additions of a paper read to the Grolier Club in New York early last year. It is adorned with some excellent photographs of the pictures of Digby and his wife Venetia, and of some of the outstanding examples of the books which he once possessed. Within the limits of such a paper it is admirably done and fills us with a lively regret that we should not have enjoyed the exhibition of books, pictures, and manuscripts which accompanied its delivery at the Grolier Club. Digby was a very remarkable character: a courtier, a scholar, a bibliophile, a fighter with a record which recalls the exploits of Drake and his fellows (and like them dubbed a pirate), and, as Dr. Fulton well remarks, a letter-writer of great merit. There are a number of conundrums in his life; not the least of which is that though he was known to be a devoted and intimate adherent of Queen Henrietta he was yet allowed to reside in England in the year 1654 and within a few months was on terms of close friendship with Cromwell. However, the known facts of his life are sufficiently remarkable to make him one of the outstanding figures of the seventeenth century. He was one of the earliest and one of the most magnificent contributors to the treasures of the Bodleian; he was one of the circle which founded and gave impetus to the Royal Society; he was an intimate friend of Ben Jonson and Selden and Boyle; and for medical men he is memorable as an early and resolute supporter of Harvey. He was as much at home in Paris as in London, and knew and revered Descartes to whose notice he brought Harvey's work. Dr. Fulton's interest however is on this occasion not so much in the man as in his books. He gives us a full account of Digby's various writings and especially of the famous "powder of sympathy"; and then passes in review the volumes which have come down to us which once belonged to Digby. Of those which he gave to Harvard in 1655 all were burned, save one, in a disastrous fire in 1764. But to judge from Dr. Fulton's lists there is no lack of superb examples in the United States.

It must be added with regret that the production of this brochure hardly does credit to a bibliophile's accuracy. The form and the illustrations are as we have said excellent, the type and the paper are good, but there are some deplorable misprints.

The Post-Mortem Examination

By SIDNEY FARBER, M.D., Associate in Pathology, Harvard Medical School. London: Baillière, Tindall and Cox. 1937. Pp. 201. 16*s*.

THOUGH this book has been most carefully compiled and is properly insistent upon attention to detail and the maintenance of good records, it remains unimpressive, and the illustrations do little to enhance its appeal. Many procedures are dealt with in a manner which suggests inexperience of their results. For instance, the advice is given to remove the pituitary by blunt dissection, to handle organs for purposes of traction by toothed forceps or clamps, to remove femoral bone-marrow by the use of hammer and chisel. These are primitive methods which lack delicacy. Nor do we feel that the omission of technical refinements is sufficiently compensated by the introduction into the text of supplementary articles dealing with anomalies of development unlikely to affect the technique described, or with disease processes.

La radiokymographie du cœur et des vaisseaux

By EMILE BORDET and H. FISCHGOLD. Paris: Masson et Cie. 1937. Pp. 134. Frs.30.

THIS short book is a valuable account of a development of radiology which is attracting increasing attention on the Continent. The first chapter deals with the principles of X ray kymography and the various modifications in technique made by different workers, due credit being given to the pioneer work of Stumpf, whose two books on the subject were recently reviewed in our columns. Then follows an account of the appearance presented by the heart and great vessels in normal and in typical pathological conditions; unfortunately the deductions drawn from the kymograms are not always easy to follow owing to discrepancies between the text and the lettering of the figures. The authors, it is interesting to observe, accept the view that movement of the aorta is due to displacement rather than to dilatation. It is the latter part of the book that makes the best reading for here the authors describe the results of their own investigations in the light of fundamental physiological principles. They show how the post-systolic residue of blood in the ventricles varies in different physiological and pathological conditions and how in valvular lesions adequate compensation depends upon the capacity to obey Starling's law of the heart. This section should be read by physiologists as well as by radiologists and physicians. Sketchy though it is, the book is highly suggestive of a direction in which clinical progress may be looked for.

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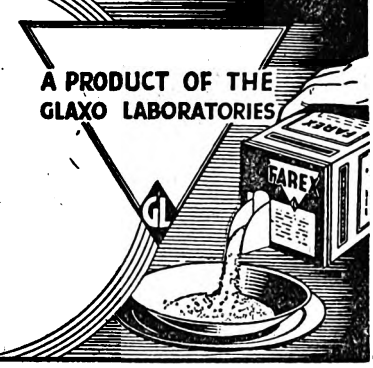

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THE LANCET

LONDON: SATURDAY, MARCH 12, 1938

THE PHYSICAL STATE OF INTERCELLULAR SUBSTANCE

IN descriptions of intercellular ground substance incidental to discussions of physiological and pathological processes, references are often made to "tissue and lymph spaces" and to "intercellular fluid or lymph." Since it was established that lymphatics form a closed system of channels, there has been no justification for the use of the term lymph space unless we can show that outside the system there are other preformed spaces into which lymph can pass. The only basis for the supposition that such spaces exist lies in the observation of clefts in the stainable ground substance seen in paraffin sections of tissues, which may be due to shrinkage from dehydration, and in the description by the CLARKS [1] of perivascular spaces which surround young growing blood-vessels observed in living regenerating tissue. Some but not all of the spaces are due to developmental shrinkage as the vessels straighten out and become narrower. All the evidence goes to show that under normal conditions the idea of intercellular fluid is also a false conception. The space between cells, vessels, nerves, and fibres is occupied by a gelatinous substance. The most convincing proof of this comes from direct observation of living connective tissues by means of the delicate and skilful technique of SANDISON [2] and of the CLARKS.[3] The gelatinous state of the intercellular substance is perhaps one of the most important of many extremely interesting facts that have been established or confirmed by means of this method, which consists in watching the actual growth of new tissue in the ears of rabbits and dogs between a transparent base and a coverslip so thin that all powers of the microscope can be used. According to these authors the intercellular substance is gelatinous until inflammation or œdema occur, when it appears to become fluid. Inflammation can be produced at will and subsequent changes in intercellular substance followed by watching the movement of red blood corpuscles or other small particles which bob about in the fluid state and remain at rest in the gel. In attempting to discover the physical and chemical nature of intercellular matrix BENSLEY [4] made bullæ, in subcutaneous connective tissue, of suspensions of living paramecia in salt solutions to which they had become accustomed. The bullæ were then excised and the preparation covered whole with a coverslip supported on bits of glass. The paramecia were watched and seen to react in a peculiar way. They were very active, swam vigorously back and forth, and suddenly rebounded without coming into contact with any visible structure. Eventually all died in the places in which they were observed. None escaped into tissue surrounding the bullæ. If the subcutaneous tissue consisted only of fibres some of the paramecia would have escaped but they were evidently confined by invisible walls of viscid intercellular substance.

A new observation in support of the view that intercellular substance is a gel comes from MACMASTER and PARSONS,[5] who watched the dyes pontamine sky blue and patent blue V diffusing out of lymphatics into which they had been injected in the living mouse's ear. By means of the Ultropak microscope it could be seen that the dyes do not pass out in a diffuse cloud but appear at first as fine, irregular, bristling or wavy lines of colour extending from the wall of the vessels. By means of a micro-probe these lines can be bent and twisted, and when pressure is removed they spring back to their original positions. The authors say that the dye appears to be fixed either between or upon preformed tissue elements. Within a few minutes the wavy lines grow wider and their margins less sharp, but on manipulation the dye still seems to be fixed. The next change is the onset of mild œdema due to the presence of the dye, and with it the colour becomes diffuse throughout the tissue. Dye can be pressed out of one portion of tissue into another with the œdema fluid, and is no longer confined to wavy elements which are probably connective tissue fibrils. The authors regard these findings as suggesting strongly that dyes extend along the interface between the surfaces of contiguous connective tissue fibres or along that between fibres and an interstitial gel. According to WOLBACH,[6] the nutrition and gelatinous state of interstitial substance is dependent in some way upon adequate supplies of vitamin C.

Thus it seems that our cells repose in a jelly, not upon a water bed. Interest in the properties of this intercellular substance is more than academic. In virtue of its physical nature alone it is probably the first barrier in the defence mechanism against bacterial aggression. Micro-organisms cannot be distributed beyond their point of entry, until the substance has been changed from solid to fluid state, and it may also impede the rate of diffusion of soluble toxic substances.

RICKETS AND *VITAMIN STOSS* THERAPY

PEOPLE speak of rickets as a vanishing disease, and happily they are not far wrong as regards Great Britain and the medically more progressive continental countries. Florid rickets with gross deformities is much less common than it was. Yet if the situation has improved it is only because of a continuous offensive, and unless positive anti-rachitic measures are maintained as an unflagging

[1] Clark, E. R., and Clark, E. L., *Amer. J. Anat.* 1936–37, 60, 253.
[2] Sandison, J. C., *Ibid*, 1928, 41, 447 and 475.
[3] Clark, E. R., and Clark, E. L., *Ibid*, 1933, 52, 273.
[4] Bensley, S. H., *Anat. Rec.* 1934, 60, 93.
[5] MacMaster, P. D., and Parsons, R. J., *Proc. Soc. exp. Biol., N.Y.* 1938, 37, 707.
[6] Wolbach, S. B., *Science*, 1937, 86, 569.

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routine the disease is one that will flourish. Dr. JOHANNE CHRISTIANSEN in Denmark heads an article [1] " Rickets has disappeared ! " and proceeds to demolish the assertion. Prof. ROMINGER of Kiel speaks of an increase of rickets,[2] and quotes authorities recording the percentage of rachitic infants as 37–46 in Westphalia, 55 in Dortmund, 40 in Vienna and Paris, and 50 (in the summer) or 75 (in the winter) in Basle. These figures indicate a very high incidence but it is unlikely that they represent a recent increase ; the probability is that observation has become much more complete and critical. When one considers, however, the completeness of our knowledge of how to prevent and cure this disease, the state of affairs described seems very deplorable.

A new piece of heavy artillery has recently been introduced into the campaign. It seems first to have been used by HARNAPP,[3] but has won greater fame under the command of BRAULKE [4] of Marburg, who gave it the name of *Vitamin Stoss* therapy. It consists in oral administration of vitamin D in one enormous dose of about 15 mg.—that is to say, 600,000 international units, an ordinary daily dose being 3000 I.U. or less. Within a very few days healing can be detected in radiograms, and this proceeds to completion without further treatment. In 50 cases BRAULKE saw no ill effect, and his observation is confirmed by BISCHOFF [5] of Greifswald who has treated 10 children in the same way. The use of the *Vitamin Stoss* is particularly recommended in cases of spasmophilia and tetany, in severe rickets with risk of fracture, and in rickets associated with infection, acute or chronic ; it has had signal success in children desperately ill with pneumonia or whooping-cough complicated by rickets. Wherever a rapid result is important *Vitamin Stoss* therapy is considered appropriate. The suggestion is also made that it might be employed to advantage in out-patient and welfare departments where the doctor cannot rely on the child's parents or guardians to carry out regular treatment conscientiously—an all too common state of affairs. Obviously the method is not one to apply lightly, but it is not unpromising, and should not be rejected out of hand.

A resemblance is evident between *Vitamin Stoss* therapy and the injection of large doses of vitamins A and D, as described by Dr. NORMAN LEAK on p. 599 of our present issue. Dr. LEAK has used such injections in the acute states of a variety of diseases and is deeply impressed by their value, though the circumstances of general practice have necessarily prevented him from securing the scientific controls needed to carry full conviction. He attributes the favourable reactions he has observed chiefly to the vitamin A which predominates in his preparation, but one is left wondering whether such large doses of vitamin D given at the same time might not be significant.

[1] Christiansen, J., *Ugeskr. Læger*, 1937, 99, 683 ; *Lancet*, Feb. 5th, 1938, p. 336.
[2] Rominger, E., *Med. Klin.* 1938, 34, 1.
[3] Harnapp, G. O., *Klin. Wschr.* 1936, 15, 1043 ; *Mschr. Kinderheilk.* 1936, 66, 318.
[4] Braulke, H., *Z. Kinderheilk.* 1937, 59, 18.
[5] Bischoff, H., *Jb. Kinderheilk.* 1937, 150, 2.

THE ANTIGENS OF THE TYPHOID BACILLUS

STUDIES that have been carried out during the past few years on various Gram-negative bacilli, and particularly on bacteria of the typhoid-paratyphoid and dysentery groups, mark an important advance in our knowledge of the chemical substances that determine the antigenicity and toxicity of these bacterial species. The studies of AVERY and HEIDELBERGER, and of many subsequent workers, had already demonstrated that the antigenic specificity of the various types of pneumococci depended on the presence in the bacterial capsules of a series of chemically different polysaccharides, and it was known that specific polysaccharides could also be isolated from other capsulated or non-capsulated bacteria. These polysaccharides had, however, the properties of haptens, rather than of complete antigens. They gave specific precipitation in the test-tube, when mixed with the corresponding antisera produced by inoculating animals with the intact bacterial cells ; but they failed to induce antibody formation themselves, when injected in the purified state. They were almost or entirely non-toxic.

In 1933 BOIVIN and MESROBEANU reported the isolation from *Bact. typhi-murium*, by extraction with trichloracetic acid, of a complex antigenic component consisting of a polysaccharide linked to a phosphatide or nucleotide ; and in 1934 RAISTRICK and TOPLEY independently reported the isolation from the same organism of a similar antigenic component by the tryptic digestion of acetone-extracted bacterial cells. In both cases the crude extracts were further purified by alcohol precipitation. The interest of these new substances lay in the fact that they not only reacted specifically in the test-tube, but induced active immunity when injected into mice, and stimulated the production of specific antibodies in vivo. They were also found to be highly toxic, and it was shown by DELAFIELD that they induced characteristic changes in the blood-sugar concentration when injected into rabbits. Further studies by these two groups of workers have shown that antigenic components of this kind can be isolated from a variety of Gram-negative bacilli, but not from Gram-positive organisms. It has become clear that they represent the O (somatic) antigens of the bacterial cells, and, at the same time, constitute the principle " endotoxin." In the particular case of *Bact. dysent.* Shiga BOIVIN and MESROBEANU have been able, by their technique, to differentiate the exotoxin produced by that organism from the somatic endotoxin.

W. T. J. MORGAN has recently shown that this somatic antigen can be isolated from *Bact. dysent.* Shiga by a third method, extraction with diethyleneglycol ; and in a still more recent paper HENDERSON and MORGAN [1] have applied the same technique to various strains of the typhoid bacillus. This organism is of particular interest because of the demonstration by FELIX and PITT of the Vi antigen and antibody, and their importance in active or passive immunisation. It has already been shown

[1] Henderson, D. W., and Morgan, W. T. J., *Brit. J. exp. Path.* 1938, 19, 82.

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by TOPLEY and RAISTRICK that the antigenic components isolated by tryptic digestion from Vi (O+Vi) and non-Vi (O) strains of *Bact. typhosum* show the same differences in immunological behaviour as the corresponding bacterial cells; so that it would appear that the Vi antigen belongs to the same chemical category as the O antigen, at least in regard to its resistance to tryptic digestion and its behaviour to alcohol precipitation, though the two antigens show minor differences in their reaction to certain other precipitants. HENDERSON and MORGAN have obtained similar results with the components isolated by extraction with diethyleneglycol. They were, however, able to include in their studies two rough strains of *Bact. typhosum*, isolated by FELIX and his colleagues, which contained the Vi antigen but were entirely, or almost entirely, free from the O antigen. They conclude from their findings, and particularly from the results of cross-precipitation tests, that the Vi antigen is not a modified O antigen, but a separate chemical entity. Their paper includes a series of interesting observations on certain differences between the antisera produced by immunisation with the isolated Vi antigen, or with the intact bacterial cells. Although both reagents induce the formation of Vi agglutinins to high titre, the protective value of the antisera produced by the partially purified antigen was found to be less, as judged by the minimal protective dose, than that of antisera produced in response to the intact bacterial cells.

BRONCHIECTASIS AND PULMONARY COLLAPSE

MOST of the speakers at a discussion reported on another page seem to have found convincing clinical and bronchoscopic evidence that post-operative massive collapse of the lung is mostly due to obstruction by a plug of tenacious secretion. Dr. MAXWELL pointed out justly that the chief danger of this condition rests in the liability of the patient to develop lung abscess or bronchiectasis and that the speedy re-expansion of the lobe affected should thus be the first aim in treatment. LEE LANDER and DAVIDSON have recently approached the subject of pulmonary collapse from the other side and believe its association with early bronchiectasis to be much more significant than is generally recognised. The classical text-book description of bronchiectasis was based on autopsy findings after years of an increasingly foul infection had led to premature death. The introduction of lipiodol has led to a recognition of a very different picture since bronchial dilatation can be detected at a stage when physical signs are absent and symptoms minimal. The old view of fibrotic contraction following infection as the factor responsible for the dilatation is no longer tenable, and the pathology of bronchiectasis is being studied afresh. The same observers have recently set forth their grounds for believing that pulmonary collapse is the invariable antecedent of bronchiectasis, the atelectasis being due to the aspiration and retention of viscid sputum.[1] They maintain, moreover, that in the absence of infection bronchiectasis is reversible; the bronchi are capable of resuming their original shape and size if the lung becomes reinflated, and when this occurs the disease is regarded as benign. LEE LANDER and DAVIDSON base their conclusions partly upon lipiodol investigation of medical and surgical cases in which a massive atelectasis has been diagnosed on clinical grounds, and partly on the experimental production of bronchial obstruction in cats, opaque oil being instilled into the trachea before and after the atelectasis is produced. Further evidence against infection as the cause of the dilatation is provided by the examination of lobes removed for bronchiectasis at the Brompton Hospital. These showed no adhesions between the affected lobe and the chest wall or between two bronchiectatic lobes, and histologically many of the affected bronchi were seen to have an intact epithelial lining.

Of particular interest is what LEE LANDER and DAVIDSON have styled the "black lobe." Those with experience in pneumothorax work are familiar with the sudden change in appearance sometimes observed in the diseased upper lobe, when it seems to diminish in volume and to assume a homogeneous density greater than that of the surrounding lung. This phenomenon commonly manifests itself after the apex of the lung has been completely freed by the division of adhesions and has been hailed by the operator as a perfect result. The authors believe this "black lobe" to indicate massive lobar atelectasis and with the aid of lipiodol they have demonstrated bronchial dilatation within it. Their theory is attractive and seems to fit the facts. The crux of the problem is the mechanism whereby atelectasis, once it has occurred, is compensated. The first effect of a massive collapse is an increase in the intrapleural negative pressure, which, if it becomes pronounced, leads to contraction of the spaces between the ribs, a shift of the mediastinum, a rise of the diaphragm, and compensatory emphysema of the lung. If the negative pressure is still not relieved the bronchi dilate. A concrete example is furnished by the catastrophe that sometimes follows an extensive apical thoracoplasty. After the operation coughing is painful and the sputum collects and blocks the bronchus to the lower lobe, causing a massive collapse. Often compensation cannot be achieved by the falling in of the thoracic wall because the mobility of the mediastinum and diaphragm is limited by adhesions due to the disease and the remainder of the lung has been put out of action by the surgeon. It is left, therefore, to the bronchi to relieve the excessive negative pressure; this they do by dilating and, if the lower lobe is not reinflated and if infection occurs, the classical picture of fœtid bronchiectasis soon becomes established. The mechanics of the development of the "black lobe" are different. Here the presence of a pneumothorax is a safe-

[1] Lander, F. P. Lee, and Davidson, Maurice, *Brit. J. Radiol.* February, 1937, p. 65.

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guard and the atelectasis can be compensated by giving a refill of air. LEE LANDER and DAVIDSON have shown how a refill in such circumstances can convert a collection of dilated bronchi into tubes of normal dimensions. As we have noted above, the authors regard a reversible bronchiectasis of this type as a "benign" form of the disease; it is, in our view, perilously close to the real thing and if at this stage infection supervenes an irrevocable clinical bronchiectasis becomes established. Fortunately in the consumptive with a pneumothorax this is a rare event.

It is pertinent to inquire into the future of the "black lobe." If the tuberculosis within it heals and it reinflates all will be well. If, however, it is the seat of massive disease it will probably never re-expand and at the end of the pneumothorax treatment either the rest of the lung will have to fill the gap by becoming emphysematous, or the pneumothorax will have to be kept up indefinitely. Relevant to this problem is the technique recently devised by BROOKS [2] for mechanically obstructing the lower lobe bronchus through the bronchoscope. By this means it is possible to induce, with safety, a massive collapse of the lobe in the presence of a pneumothorax as an auxiliary method in the treatment of basal phthisis. The manœuvre is said to be followed by considerable improvement in the local lesion, evidenced by a rapid closure of the cavity. Whether this procedure does more than snatch the patient from the frying pan of phthisis and drop him in the fire of an even more unpleasant disease is not yet certain.

ANNOTATIONS

THE CARE OF THE ELDERLY INSANE

THE recent clamour over what is regarded as too ready certification of elderly persons in the public assistance institutions of West Wales reflects an anxiety which is easy to understand. The elderly men and women who show conduct disorder generally belong to one of three types: (*a*) those who have been insane for years, such as chronic schizophrenics; (*b*) those who show disorders of behaviour due to physical causes such as cardiovascular and renal disease, or more commonly cerebral atheroma, hypertension, or degenerative processes; (*c*) those manifesting the mild character changes of senility, with occasional outbreaks. From the point of view of the family the distinction between types (*a*) and (*b*) is not negligible. The former should be included in any genetic survey of mental disorder; whether the condition of the latter has genetic import, depends, among other factors, on the form of the physical disorder, and the degree to which this has precipitated mental symptoms. In any case the relatives of a person belonging to type (*a*) should regard the defect in their stock more seriously than those of type (*b*), in whom the stigma of mental disorder may not be warranted at all and in any case is of a very different order. The lack of understanding of these differences is unfortunate in so far as it sometimes leads to the withholding of information.

The senile dement (type (*c*)) can generally be managed in his own home or in a municipal hospital. The other types include men and women whose conduct is so abnormal that it cannot be dealt with outside a mental hospital, and those whose lapses of behaviour are rather negative than positive in character. Patients of long standing in mental hospitals ultimately reach this vegetative stage and remain in it for many years. All hope of cure has been abandoned, and the possibility of their being suitably cared for elsewhere has often not been considered. The overcrowding of the mental hospitals has recently, however, led to suggestions from the Board of Control that many chronic harmless psychotics might be transferred from these hospitals to the infirm wards of a municipal hospital. These proposals have aroused almost as much criticism as those for transfer in the other direction. More coöperation between the authorities of the different types of institution is certainly needed and possibly the colony system might be adopted with advantage. In several continental countries the community cares for psychotics of certain types as well as for defectives in big colonies within the limits of an ordinary village, for example at Gheel in Belgium and Dun-sur-Auron in France. Those patients not requiring custodial care are accommodated in families, where they take their share of such work as is suitable to their mental and physical state. The success of less ambitious schemes has recently been reported from Poland.[3] There some of the insane are placed in houses within a mile or two of the mental hospital, often those belonging to hospital employees. In one centre a colony system was started 80 years ago at a distance of forty miles from the main hospital, and 200 patients were housed there under adequate medical and nursing supervision. Nearer home, the fact that boarding-out of defectives in Scotland has been so satisfactory suggests that in England we are too hide-bound by our conception of custodial care and that an extension of the boarding-out system to psychotics may solve more than the economic problem. The enthusiasm over occupational therapy may be a blind that shuts out further consideration of the occupation and social care of the elderly and quiescent insane.

THE PIRQUET CONTROL OF NURSES IN HOSPITAL

THE Assistance Publique, which is responsible for the administration of the public hospital services in Paris, appointed Dr. E. Rist as long ago as 1923 to examine and report on those members of the hospital personnel who might develop tuberculosis. In 1935 this system was amplified, and Dr. Rist was invited to supervise the medical examinations for possible tuberculosis of all the nurses entering the Salpêtrière school of nursing, which is the main source of supply of nurses for the Paris hospitals. The examinations included radiography of the chest and Pirquet testing as routine measures supplemented, if need be, by a clinical examination and inquiries into the nurses' antecedents. On Jan. 11th Dr. Rist and his colleagues, Dr. P. Reyt and Dr. J. Tuchila, in a communication to the Academy of Medicine, traced the Pirquet careers of the 165 women who began their nursing activities in October, 1935. They were classified according as they belonged to section A (nursing proper), or section B (administra-

[2] Brooks, W. D. W., *Brit. J. Tuberc.* January, 1938, p. 14.
[3] Report to the International Health Office, see *Bull. Off. int. Hyg. publ.* December, 1937, p. 2564.

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tive services such as kitchen and linen cupboard). Section A comprised 144 probationers who were of course much more likely to be exposed to infection than the 21 women working in a comparatively tubercle-free atmosphere. The nurses found to be Pirquet-negative in October, 1935, were tested again in June, 1936, January, 1937, and October, 1937, and, as was to be expected, the proportion of conversions to the Pirquet-positive state was much higher in section A than in section B. In the autumn of 1935 the ratio of Pirquet-positive to Pirquet-negative nurses was 97 to 68; two years later, 46 of the 68 negative reactors had become positive reactors at the cost of 8 cases of tuberculosis, 2 of which terminated fatally. In contrast to this high tuberculosis rate was the complete absence of signs of tuberculosis among any of the 97 probationers who were already Pirquet-positive when they began their nursing studies. These observations confirm the findings of J. Heimbeck at the Ullevaal Hospital in Oslo. If the tuberculosis prognosis for the originally Pirquet-negative probationer is a shade less black in Paris than in Oslo, the difference may be due to the fact that at Ullevaal probationer nurses plunge forthwith into work in tuberculosis services, whereas the Salpêtrière nurses are allocated to such services only towards the end of their training.

CONGENITAL HYPOTONIA

AT the beginning of this century when pædiatrics was beginning to be established as a specialty, interest in disorders of infancy and early childhood led to the recognition of many typical syndromes and to their association with the names of those who had described them. Later clinical and pathological observations modified many of the distinctions on which these groupings were based, though a few types still remain firmly established in their original form. The pathogenesis of muscular flaccidity in early infancy is perhaps the question on which opinion has undergone the most change, and it is still not clearly understood. The term myatonia or amyotonia congenita was applied by H. Oppenheim to the type of infant exhibiting generalised muscular flaccidity at or soon after birth, the condition being looked upon as primarily myogenic. In 1913 F. E. Batten, classifying myopathies, referred to a "simple atrophic type" characterised by smallness, loss of power, and loss of tone of *all* the muscles of the body without localised atrophy, and he included Oppenheim's disease in this category. But the view that myatonia was dependent on disease of the lower motor neurone was already gaining ground, and in the same year Oppenheim ascribed the pathological process to delayed development of the musculature *or* of the anterior horn cells. A few years later it had become established beyond doubt that this disorder was not one of muscles, and thereafter no reference appeared in text-books of the subject to any *congenital* myopathy. The only type of myopathy recognised in early infancy is the Landouzy-Dejerine type which is not associated with generalised hypotonia.

The possible occurrence of congenital myopathy is suggested, though this point is not emphasised, in a study of congenital paralysis and hypotonia by Prof. Cornelia de Lange of Amsterdam.[1] She gives a clinical and pathological account of an infant with amyotonia which died on the twentieth day, probably the earliest age at which a histological examination has ever been undertaken. The author's belief in the identity of Oppenheim's and Werdnig-Hoffmann's diseases is forcefully expressed. Her arguments carry conviction, though they add little to the review of the subject by Greenfield and Stern in 1927. She goes somewhat further, however, in suggesting that amyotonia is to be regarded as an abiotrophy in the sense of Gowers. When he introduced this conception Gowers did not apply it to any disorder which was manifest at the time of birth, but it may legitimately be extended to include a prenatal failure of vitality. Prof. de Lange proceeds to consider the differential diagnosis of hypotonic infants in some detail. She agrees with the decision of Greenfield and Stern in their critical survey of cases published as amyotonia to reject those (three) in which the nervous system showed no histological abnormality, and submits that these were cases of "Erb's disease, dystrophia musculorum progressiva"; it will be remembered that this term was applied by Erb to myopathies in general, to emphasise his view that they formed a single nosological entity. Prof. de Lange emphasises the existence of a congenital or early infantile type of this disease, and gives details of some members of an affected family, one of whom came to post-mortem examination. An important point in the clinical diagnosis of these cases from amyotonia is the participation of the diaphragm in the paresis. There would appear to be a close correspondence between the type of case here described and the simple atrophic type of myopathy referred to by Batten, and it may be that the occurrence of myopathies in the first few weeks of life deserves more explicit recognition than it has received of late.

[1] *Acta pædiatr., Stockh.* 1937, **20**, Sup. III.

PREPARATION OF TYPHUS VACCINE

THE preparation of vaccines made from ordinary bacteria presents little or no difficulty; but that of vaccines from rickettsiæ or filtrable viruses is far from simple. Hitherto it has been common to infect a suitable animal and to use its tissues, either untreated or after exposure to formol or some other inactivating agent, as the actual vaccine. The difficulties and dangers of this procedure are well known, and attempts have been made in recent years to supplant the use of living animals by tissue cultures of the virus. Already successful results have been reported with vaccinia virus. It now seems probable that similar success may be achieved with the virus of typhus—*Rickettsia prowazeki*. In two communications Zinsser, Wei, and Fitzpatrick [1] describe the growth of both murine and classical strains of this organism on Maitland cultures put up in sloped agar tubes. A 4 per cent. agar solution in water is mixed with an equal volume of double strength Tyrode's solution to which 50 per cent. horse-serum has been added before filtration. The initial reaction, which is controlled by phenol-red in the tubes, should be about *p*H 7·4–7·6. The agar is sloped in a test-tube in the ordinary way. Guinea-pig tunica is minced very finely, and is heavily inoculated by dropping the centrifugalised concentrate of a Maitland culture on to the tissue in a Petri dish. After 5 or 10 minutes at room temperature this tissue is then "buttered" on to the surface of the agar, and the tubes are closed with a rubber stopper through which passes a glass tube drawn to a capillary at the upper end. The purpose of the tube is to control the reaction of the medium. As the tissue metabolises CO_2 is given off; if it is allowed to accumulate, the reaction becomes too acid. By breaking the capillary, the

[1] Zinsser, H., Wei, H., and Fitzpatrick, F., *C.R. Soc. Biol. Paris*, 1938, **127**, 229; and *Proc. Soc. exp. Biol., N.Y.* 1937, **37**, 604.

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gas can escape and the reaction remains alkaline. After incubation for six days some multiplication is already apparent; after ten days smears from the tissue on the surface of the agar show a growth of rickettsiæ. The amount of growth obtainable is surprising, and it is believed that each tube will suffice for two or three doses of vaccine. When it is remembered that Weigl's vaccine, which is prepared by the cultivation of rickettsiæ in the louse's intestine, requires about 150 lice for the vaccination of each individual, it will be realised that the method now described by Zinsser and his colleagues may afford a great saving in both time and labour. The method clearly needs elaborating, but if the results already obtained are confirmed it should prove of value both in academic and in practical work, and it is even possible that it may be applicable to the cultivation of filtrable viruses.

CYSTIC ENDOMETRIAL HYPERPLASIA

CYSTIC endometrial hyperplasia, according to present beliefs, is due to the persistence of cystic ovarian follicles and to the continued action of œstrogenic hormone. This view is based both on pathological studies and on a number of experimental investigations. It is also possible, as was first speculatively suggested by Witherspoon, that fibromyomata of the uterus are due to excessive œstrogenic stimulation. Nelson's [1] experimental observations on guinea-pigs support this conclusion, while Murray Blair [2] states that 81 per cent. of the uteri removed in 1934 at the Vancouver General Hospital because of fibromyomata showed cystic hyperplastic changes. Such a high proportion cannot reasonably be regarded as a pure coincidence. In a recent paper Randall and Herrell [3] report that progestational differentiation, presumably caused by luteal stimulation, can often be observed in an endometrium which also shows cystic changes. Their interpretation of this fact is that the occurrence of the luteal response is secondary to the œstrogenic stimulation. Confirmatory observations are provided by Murray Blair,[2] who reports that luteal cysts may be found in the ovaries of women with endometrial hyperplasia. Campbell and his colleagues,[4] on the other hand, believe that the corpus luteum functions according to an "all or nothing" law, and they mistrust diagnoses of endometrial hyperplasia in cases where progestational changes can be detected. This view has long been maintained by Burch, and it receives further support in a recent statement by Mason and others [5] who affirm that signs of current corpus luteum activity are absent in cases of "Swiss cheese" endometrium. A priori, however, it seems unlikely that the corpus luteum functions in an "all or nothing" manner. There is, moreover, ample experimental evidence that the extent of the changes which luteal hormone will cause in the endometrium at any given time will depend on the degree of œstrogenic stimulation. Until recently, the treatment of cystic endometrial hyperplasia usually involved the patient in the dangers of a major abdominal operation, for hysterectomy was often the only method of preventing the profuse and troublesome uterine bleeding associated with the condition. The evidence now before us suggests that progesterone in doses sufficient to counteract the excess of œstrin may prove to be a rational and safe method of treatment. Alternatively the condition would seem to be one in which testosterone propionate, to the gynæcological uses of which we have recently referred, might be tried.

[1] Nelson, W. O., *Anat. Rec.* 1937, 68, 99.
[2] Blair, E. M., *Canad. med. Ass. J.* 1936, p. 603.
[3] Randall, L. M., and Herrell, W. E., *Surg. Gynec. Obstet.* 1937, p. 666.
[4] Campbell, R. E., Lendrum, F. C., and Sevringhaus, E. L., *Ibid*, 1936, p. 724.
[5] Mason, L. W., Black, W. C., and Gustavson, R. G., *Amer. J. Obstet. Gynec.* 1938, 35, 189.

HEALTH EXHIBIT AT GLASGOW

THE Ministry of Health, in collaboration with other authorities, is organising a "Fitter Britain Exhibit" at the Empire Exhibition which opens in Glasgow in May. Later the exhibit will be packed up and sent on tour through the country. There will be a main hall approached through a vestibule with mural paintings of the family doctor and his auxiliaries. In the centre of the hall a "mechanical man," 11 feet high, will demonstrate the actions of respiration, digestion, and the circulation of the blood, and there will be scale models of a central health clinic and a general hospital. Bays on one side of the hall will show, by means of sculpture, photographs, and dioramas the provisions made for the health of infants, school-children, and adults. On the other side the first bay will contain a working model of a family taking well-balanced meals and a cartoon film showing the effects on the body of the various food constituents. The next bay will deal with housing and show a slum dissolving into modern houses, and the third will illustrate the safeguards taken against infection at a model port. Finally beyond the main hall there will be a darker chamber illustrating the perils of diseases and insect pests and the progress made in dealing with them.

WHAT IS SADISM?

THE recent flogging of two men for robbery with violence calls forth varied views whose vehement expression often marks their emotional value. There may be a frank satisfaction that a brutal crime has been met by a brutal punishment; the deterrent effect may be stressed, whereupon the penologist breaks in with the question whether a possible deterrent effect is worth the risk of arousing a dangerous antisocial reaction; or there is absolute condemnation of the flogging and the publicity that has attended it, supported by accusations of "sadism" which may or may not be understood by people who use the word so freely. Such accusations, in the absence of understanding, can only confuse the issue and spoil what may be a good cause. The eponymous originator of the word was a marquis whose memoirs described his sexual gratification from the infliction of pain upon others, and such perversions are sufficiently common to justify its use; how common they may be is not to be determined, but every clinical psychologist is aware of their occurrence and of the unfortunate stimulation the tendency receives from specific incidents. Farther along the scale are cases in which there is an impulse to the infliction of pain but its sexual nature is not recognised by its perpetrator. It is likely that some cases of cruelty that come before our courts are of that nature.

We owe to psycho-analysis the extension of the concept of sadism beyond those examples in which it is a conscious manifestation. To some extent this is a matter of direct observation, when, for example, in the course of analysis a patient discovers the motivation of past behaviour; an adult may recall being attracted in earlier life towards some account of cruelty and may now recognise the true nature of the attraction, of which he was not conscious at the time. It becomes more speculative when the impulse to inflict pain or, what is much the same, to act aggressively in physical ways, is ascribed entirely to this

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same sadism. The recognition of a widespread impulse to cruelty is being forced upon us to-day, and, whether the psycho-analytical generalisation is correct or not, the popular use of "sadism" and "sadistic" as catchwords to indicate opprobrium and condemnation is more likely to rouse opposition than to lead to a calm discussion of a serious matter.

EFFECT OF ADRENALINE ON NITRITE COLLAPSE

THE various vasoconstrictor drugs, of which adrenaline is one of the more powerful, have not proved very useful in the treatment of shock in its manifold forms. As is well known from therapeutic experience the nitrites may produce symptoms of collapse or shock, and the effects of sodium nitrite have been used by Wilkins, Weiss, and Haynes [1] to test the action of adrenaline. It was found that after administering 3 grains of sodium nitrite to healthy young men syncope occurred after a short interval, when they were tilted up to an angle of 75° to the horizontal. It was accompanied by decrease of venous tone and of blood flow in the hand, with a fall in arterial pressure and a rise in heart-rate. When 1 mg. adrenaline was injected after giving the nitrite, the symptoms appeared more quickly after tilting; as compared with the effects of nitrite alone the venous tone was little affected, the blood flow was further reduced, and the arterial pressure was usually much reduced, though it might remain relatively high. The results are interpreted as showing an arteriole-constrictor effect of nitrite in the upright position, which is intensified by adrenaline; the decrease in venous tone resulting from the nitrite is not overcome by adrenaline. These observations on vascular changes in the hand, if they can be assumed to apply also to the vital centres, would explain the symptoms. It is evident at any rate that adrenaline increases the collapse symptoms caused by nitrite, and although this particular condition is not likely to be encountered in practice, it is possible that a similar mechanism underlies other and commoner forms of shock.

CASUALTY SERVICES IN BARCELONA

SIX months ago some account was given [2] of the medical and other provision for refugees in Barcelona and elsewhere in Catalonia. Although an appalling shortage of necessities still exists, much has been done since that time to advance and reorganise the medical and social services to meet the emergency. Recently to the overcrowding and dearth of equipment has been added intensification of aerial bombardment of all coast towns and of Barcelona in particular. As many as 300 casualties, many in a dying condition, were recently brought to one hospital in the space of 15 minutes. It is natural that the existing civil hospitals, even with addition of the stadium which has been converted into a temporary refugee hospital, have proved inadequate to deal with the vast increase in emergency medical work of all kinds. The Public Health Council of Barcelona has now undertaken the courageous project of replacing the old dispensaries with a series of six completely modernised polyclinics, and of building in addition a large tuberculosis sanatorium and a home for incurables outside the city. In some cases it has been possible to convert pre-existing buildings—e.g., the old Bank of Barcelona by the Porta de la Pau—into polyclinics, but the construction of all follows the same general plan. They are of two stories, a central waiting-room on the ground-floor leading to consulting-rooms for general medical, pædiatric, and otorhinological cases, whilst the whole of one side is devoted to a large surgical department, including two operating theatres, X ray, and diathermy. On the first floor are similar departments for gynæcology, neurology, gastro-intestinal diseases, dermato-syphilology, and dentistry; clinical and bacteriological laboratories; dispensary; a six-bed ward for cases too ill to be moved to hospital; and accommodation for a doctor and two nurses. The construction of the buildings is now largely completed, but the equipment is proving very difficult, since almost the whole of it must be purchased in England with a greatly depleted currency.

[1] Wilkins, R. W., Weiss, S., and Haynes, F. W., *J. clin. Invest.* January, 1938, p. 41.
[2] *Lancet*, 1937, 2, 929.

EMPLOYMENT DURING PREGNANCY

THE effects of industrial employment upon the health of the pregnant woman, her infant, and her other children has recently been studied by Dr. Margaret Balfour.[1] Many women continue to work after marriage in the pottery and textile trades and in her search for statistical information Dr. Balfour has therefore sought the help of the medical officers of health of towns in which these industries figure largely. Particulars were obtained through antenatal and infant welfare centres and health visitors from 3732 primigravidæ, 380 of whom were classified as weavers, 1743 as other workers for gain—in various occupations in the factory, shop, or domestic service—and 1609 as housewives employed only in their own homes. For each of these groups calculation was made of the maternal mortality-rate, the neonatal death-rate, and the stillbirth and prematurity rates. Between the home workers and the large general group of women gainfully occupied there appears to be no significant difference in these rates, but the rates of the weavers, with the exception of stillbirths, are substantially higher than those of the other groups. A further division of the general occupied group into standing and sitting workers suggests—the figures are not sufficient to do more—that relatively high rates of neonatal deaths and stillbirths characterise the standing group. Another subdivision of the data into those who left off work before the end of the sixth month and those who continued to work beyond that time indicates a disadvantage to the latter. Very little difference, however, is to be observed between the average birth weights of the infants born to these various groups of women. Dr. Balfour, therefore, concludes that gainful work other than weaving does not lead to unfavourable results in the mother but that damage to the child may well ensue if work is continued after the sixth month of pregnancy. In the weaving group it would be of some interest to ascertain, if possible, how the women compared with those not employed in weaving but living in the same towns; the present less controlled comparison is between weavers and a group more widely spread geographically.

In a second study [2] Dr. Balfour gives particulars of 1443 multiparæ, 410 being gainfully occupied and 1033 employed in the home. Of the children who had been born to the occupied group a slightly larger percentage were dead at the time of inquiry than was observed with the home workers. It seems difficult in this case to be sure which is the cart and which the horse. Possibly, more children may be dead because the mother is employed and therefore unable to give them proper attention; alternatively the mother may tend to remain

[1] *Publ. Hlth., Lond.* January, 1938, p. 106.
[2] *Med. Offr*, Feb. 12th, 1938, p. 67.

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employed because a child is dead and she has therefore a smaller family to look after or is not tied by an infant. Dr. Balfour's own belief is that the mother should not be discouraged from work which in poor families is likely to secure better nutrition, better clothing, and more of the other amenities of life than is otherwise possible without family allowances; but that enough creches and nursery schools are required, together with school meals, to compensate for the mother's absence from home.

THE HEART ON THE SCREEN

HAVING shown us the activities of Finland and the unpleasant things that America is doing to her insect pests, the tenth and latest of the March of Time films proceeds to enlighten us on heart disease. It starts as a thriller with two sudden deaths, to a statistical accompaniment by the commentator. He tells us that heart diseases head the list of causes of death but are on the increase only because there are more old hearts to be affected. "Social infection," he says, accounts for 10 per cent. of cases, rheumatism for 30 per cent., and old age and hard work for another 45 per cent. We are shown the radiographer, the electrocardiographer, and the pathologist at work and, the high spot of the film, are allowed to listen to the clinician's stethoscope and hear the normal heart sounds with cavernous clearness, and a presystolic murmur like a roll of drums. There is too little of this, the only sound effect beyond the commentator's voice; more examples might have cleared the layman's mind for ever of the delusion that a stethoscope is merely a badge of office. We are then taken back into the childhood of Charlie Abbott, the owner of the drum-like murmur, and shown the youthful Charles complaining to his mother of growing pains and a few years later lagging behind his fellows on their bicycles. As a young man his job entails hoisting crates on a lorry, but his heart lets him down and he must submit for a time to the familiar doctor in the long white coat. But future Charlies will be better cared for; their growing pains are dealt with at special sanatoria and they have behind them the educational propaganda of the American Heart Association and the research workers of the Rockefeller Institute. A surprising amount of this wide subject is thus covered in twenty minutes, but perhaps the average member of the audience would have liked more of the tricks of cardiology and less of the slow movement of vast organisations.

MOTOR-HORN NOISES

THE official committee which under the chairmanship of Mr. G. W. C. Kaye, D.Sc., inquired into the noises associated with mechanically propelled road vehicles has just issued its final report, on motor-horn noises.[1] The 47 horns tested embraced all the types on the road to-day—electric and klaxon, bulb and wind-driven, sirens and electric gongs. Incidentally the two latter will henceforward be reserved for certain special types of vehicles, such as ambulances and fire engines. The main object of the tests was to ascertain, if possible, the chief factors contributing to the stridency and annoyance of horns, and the extent to which these are inherent in their efficacy as warning devices on the road. The committee accordingly analysed the sounds of the horns into their chief components, determined the overall loudness at a specified distance, and explored the sound field round certain of the horns. Some of these proved to be very directional in character, particularly those emitting sounds rich in high-pitched components. The loudness ranged from 82 to 113 phons measured from 20 feet in front, and from 80 to 104 phons measured from the side.

The first question was to ascertain how loud horns should be to enable the driver of an overtaking vehicle to attract the attention of one in front. Tests showed that "overtaking horns" as loud as 105 phons may be required to reach the ear of the driver in some types of car or light van or bus, while only very loud horns (110 phons or more) can get through to the driver of noisy lorries. The difficulty of evaluating the annoyance factor was that impressions of noise are personal to the individual and may differ profoundly among a group of listeners. Since legislation must be based on the views of the "average listener," more than 200 persons, varied in sex and age, were asked to set down their reactions in quiet surroundings to the different horns under one of the headings: unbearable, very objectionable, objectionable, tolerable, and agreeable. The report shows in a diagram the wide spread of the extreme opinions, though a majority consensus could be derived from the 30,000 observations without much difficulty. The observations were conducted with sustained notes, though the influence of interrupted or staccato operation was recognised. The next question was to find, if possible, one or more measurable physical factors which could be correlated with the annoyance assessments. No simple relation of this type could be deduced from the composition of the noise, though in general harsh noises containing high-frequency components were more annoying than equally loud musical sounds without such components. The only simple generalisation to emerge was the influence of loudness on the annoyance, a relationship which, despite certain anomalies, was found to supply a workable criterion. It appeared from these observations that the average pedestrian and other quiet occupants of a quiet street are likely to be annoyed by sounds louder than 95 to 100 phons from horns 20 feet away, and would certainly consider still louder horns offensively noisy.

The committee had to seek a compromise between the conflicting requirements of the several users of the road; they recommended a limiting loudness of 100 phons at a distance of 20 feet, believing that this would meet the requirements of most drivers and yet lead to a substantial diminution of the discomfort experienced by involuntary listeners. This limitation is likely to cause little inconvenience in the future if the previous recommendations of the committee on the reduction of motor vehicle noises are gradually adopted. Details are given in the report for carrying out the proposed tests of loudness.

The work of the committee has provided data which will be invaluable should it prove necessary to bring into force regulations designed to curb the activities of the unreasonable minority of road users who delight in unnecessary noise.

CROYDON town council at its meeting on Tuesday evening decided to appoint a water engineer.

Dr. GEORGE RIDDOCH will deliver the Lumleian lectures to the Royal College of Physicians of London on March 15th and 17th at 5 P.M. He will speak on pain of central origin.

WE regret to announce the death on Wednesday morning of Sir RAYMOND CRAWFURD, consulting physician to King's College Hospital and registrar of the Royal College of Physicians of London.

[1] Noise in the Operation of Mechanically Propelled Vehicles. H.M. Stationery Office. 1s. 3d.

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SPECIAL ARTICLES

HEALTH ASPECTS OF THE TRINIDAD DISTURBANCES

CONSIDERABLE public health interest attaches to the report [1] of the Commission appointed to inquire into the disturbances that occurred in Trinidad in June, 1937. The commissioners found on investigation that the causes of the disturbances had wide ramifications throughout the social structure of the colony. They traced the "true origin" of the trouble to a more or less general dissatisfaction of the workpeople with their social and economic circumstances, "an underlying current of resentment" due to various causes, one of the most important being "the deplorable conditions in which a large number of the labourers and their families are housed." Their report therefore gives prominent place to the health conditions of the colony, including the arrangements made for medical and public health services.

HOUSING CONDITIONS

Trinidad has an area rather less than Lancashire and a population of about 448,000, of whom some 150,000 are natives of India or their descendants. The great bulk of the remainder are of negro stock. About 43 per cent. of the people are unable to read or write. The main products of the island are sugar and cocoa, but there are valuable mineral resources—i.e., petroleum oil and asphalt, and oil now forms 59 per cent. by value of the total exports. Agriculture was formerly carried on with indentured labour, the employer being legally obliged to provide free housing accommodation for his labourers; and though the indenture system, which began in 1845, was abolished in 1917, the workers still feel that free quarters should form part of their conditions of service and it has become almost impossible to discontinue such provision. In practice this has perpetuated the old "barrack" dwellings, which generally consisted of a long wooden building roofed with galvanised iron, divided from end to end by a partition and subdivided on both sides into a series of single rooms. Unfortunately, this type of back-to-back dwelling seems to have been taken as a model for use elsewhere than in the agricultural districts. In Port-of-Spain, the capital of the colony, the commissioners visited barrack dwellings, let at monthly rents varying from 12*s.* to 15*s.* a room, which they found "indescribable in their lack of elementary needs of decency." The medical practitioners with whom the commissioners came into contact, as well as social workers and representatives of religious bodies, expressed strong views on the ill effects of the barrack dwellings on the mental, moral, and physical conditions of the workpeople; and the commissioners express agreement with the acting director of medical services not only that the erection of new barrack dwellings should be prohibited, but that the existing dwellings of this type should be swept away. They attach great importance to the housing question in Trinidad, saying "In no aspect of our inquiry have we been more impressed by the evidence placed before us and by our own investigations, than as regards the conditions in which large numbers of the working population, both urban and rural, are housed."

In such conditions it is not surprising that ankylostomiasis is prevalent. Some districts have an infection-rate of 80 per cent. The post-mortem records of the Colonial Hospital, Port-of-Spain, show that worms in enormous numbers were found in 50 per cent. of all East Indian adult patients. The incidence is highest in women. Malaria is stated to be the most formidable disease in the colony. Though it is not notifiable, 18,902 cases with 473 deaths were reported in 1936. Venereal diseases are widespread. The number of hospital admissions in 1936 was 1007, but these, it is stated, represent merely a small fraction of the existing cases. The vital statistics of the colony are more favourable than might be expected. The crude death-rate has declined steadily from 19·58 in 1933 to 16·28 in 1936, and infant mortality from 127 in 1934 to 97 in 1936. The maternal mortality-rate is estimated at 4·76 per 1000 pregnancies.

DEFECTS IN PUBLIC HEALTH ORGANISATION

Public health administration is carried out by the local sanitary authorities under the general supervision of the Central Board of Health. The director of medical services, who is chairman of the Central Board of Health, is the head of the Government Health Department, and for each of the two geographical divisions into which the colony is divided for health purposes there is a senior medical officer of health, who has under him a school medical officer and a venereal disease officer. These officers are full-time Government officials, and there are in addition a number of part-time district medical officers, who act also as secretaries of their respective local sanitary authorities. The report issued in 1934 of a committee appointed two years previously by the governor to consider reorganisation of the medical service of the colony was followed by changes in personnel among the senior officers of the Health Department, and the present director and deputy director of medical services have not yet completed two years in their posts. This factor must be borne in mind in connexion with the criticisms made by the commissioners. They confirm the view of the Medical Reorganisation Committee that public health duties should be in charge of whole-time officers who have no urgent prior claims of another character and cannot be suspected of allowing their private interests to conflict with their official duties. They found that in at least two cases the health officer of a district was the servant of an industrial undertaking operating in that district and regarded this arrangement as open to still greater objection than the combination of private practice with official duties.

In Trinidad there are two "colonial hospitals" maintained from public funds—the largest, the Colonial Hospital at Port-of-Spain, having 403 beds—six district hospitals, two emergency hospitals, a mental hospital, two houses of refuge, and a leper settlement. Patients able to pay are charged from 1*s.* to 3*s.* a day in the general wards and 10*s.* in the private wards, but many are admitted free. For the poor, free treatment is available at the out-patients' department of the hospitals and at dispensaries throughout the colony. The Government maintains two hookworm units, continuing the work carried on from 1914 to 1924 by the Rockefeller Institute, and anti-malaria measures, such as land reclamation, concreting drains, oiling, &c., are carried out. The usual methods of mosquito control are in operation.

RECOMMENDATIONS

The commissioners find many defects in the system of health administration. They think that the

[1] H.M. Stationery Office. Cmd. 5641. Pp. 120. 2*s.*

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Central Board of Health, which meets about twice a year, serves no useful purpose, that the local sanitary authorities have not fulfilled their functions satisfactorily, and that in so small a colony the division of responsibility between the Central Board of Health, the local authorities, and the Health Department is open to serious objection. They recommend that the Central Board of Health should be relieved of its executive functions, if not abolished, that the local authorities in the rural districts should be abolished, and their executive powers, together with those of the Central Board of Health, vested in the director of medical services, who should have a staff with a sufficient number of full-time health officers as will ensure that the ordinary health work of the colony will be adequately carried out.

The report brings out the importance of health conditions as a factor that must be taken into account by those responsible for the framing of general public policy. It is not surprising that people living in the conditions described by the Commission should be a discontented people.

MEDICINE AND THE LAW

Post-encephalitis and Compensation

ON March 2nd at the Chipping Norton County Court a reserved judgment was given in an arbitration between Harry Booken, an assistant engineer of Chipping Campden, and the University of Bristol Fruit and Vegetable Research Station. The question of post-encephalitis following upon an accident arose, probably for the first time. On Oct. 10th, 1930, the applicant, then about 30 years of age, while in the employ of the respondents, got caught in the machinery as he was oiling bearings on a girder. His back was skinned in places, his chest and arms bruised, and his left arm violently wrenched. He is said to have suffered a head injury but never became unconscious. For three weeks following the accident he was unable to raise his left arm and shoulder. In December his usual medical attendant noticed that the muscles of the left side had wasted and that there was general stiffness when walking. He returned to work in the following January, but his left arm and shoulder pained him and he was unable to grip his tools as previously. The applicant left the employ of the respondents in February, 1932, and then worked in other employ until March, 1934, when he gave up work with a blacksmith. His medical adviser at that time noticed a tremor in his left hand and from then onwards he had gradually deteriorated in health and was now in a serious condition.

Dr. G. S. Hall, first assistant to the neurological department of the Birmingham General Hospital, called on behalf of the applicant, said he saw him on Nov. 2nd, 1937, when he was suffering from the after effects of sleeping sickness, or post-encephalitis. The symptoms were similar to Parkinson's disease. Witness said he thought that at the time of the accident the applicant had sustained severe injury to the muscles of both shoulders and upper limbs, especially the left. While suffering from the immediate after effects of the accident his progressive symptoms had set in. Witness believed that sleeping sickness starting before the accident had been lit-up by it, and that the applicant's present condition had been solely precipitated by the accident. He was not surprised that tremor had not developed before it did.

Dr. Ernest Bulmer, physician to the hospital, who also had seen the applicant on Nov. 2nd, 1937, was called by the respondents. He agreed with Dr. Hall that the applicant was suffering from post-encephalitis with parkinsonian symptoms. He had gathered from the applicant that he had suffered from influenza; that, he thought, was probably a very mild encephalitis. In his opinion the accident had no relation to the present illness but was a coincidence. He could only recall one case in which he had thought trauma had brought about encephalitis and there the patient was an old man. An additional factor supporting his opinion was the late appearance of the tremor. In cross-examination the witness admitted that trauma might precipitate encephalitis and that such an injury suffered by the applicant might precipitate the disease. He was, however, convinced that the applicant would have suffered from the disease in any case.

Judge Cotes-Preedy, K.C., in the course of his judgment, said he was satisfied from the evidence that the applicant before the accident was a man of ordinary health and strength, and that since the accident his health had gradually deteriorated. The fact that he was now suffering from a serious and somewhat obscure disease gave rise to a difficult question. After comparing and balancing the probabilities which emerged from the evidence he had come to the conclusion that the applicant had discharged the onus upon him and that the disease from which he was now suffering had been contributed to by the accident. He therefore found the applicant to be totally incapacitated and that the compensation of £1 0*s.* 2*d.* per week must commence as from April 1st, 1934.

PROTECTION OF X RAY AND RADIUM WORKERS

THE British X Ray and Radium Protection Committee has just issued its fifth revised report and recommendations,[1] a publication of considerable moment for all who are responsible for X ray installations, therapeutic, diagnostic, and commercial. The committee was set up in 1921 because public opinion had been much disturbed by a series of fatalities resulting from exposure to X rays and radium, and from its inception has been under the wise chairmanship of Sir Humphry Rolleston. It has drawn up special recommendations designed to protect workers against undue exposure to radiation, to minimise the risk of electrical shock, and to ensure adequate ventilation. In 1928, at the instance of this British committee, international recommendations for X ray and radium protection were adopted by the second International Congress of Radiology at Stockholm. These proposals, based on the principles laid down in Britain, have been revised at subsequent meetings held at triennial intervals of the international congress, and have been accepted in many countries. The last revision took place quite recently as a result of the work of the International Protection Committee which met under the chairmanship of Mr. G. W. C. Kaye, D.Sc., at the fifth International Congress of Radiology held in Chicago last September.

The safeguards urged by these committees are of real importance because experience has shown that even under modern conditions carelessness or inade-

[1] Obtainable from the hon. secretary of the committee at 32, Welbeck-street, London, W.1.

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quate protection results in ill health, the most constant findings being a low average white blood-cell count. In previous reports it was pointed out that no figures for tolerance of exposure to gamma rays were available: in this report it is accepted that a person in normal health can tolerate with impunity exposure to X rays or gamma rays, the equivalent of one international roentgen (r) per week. This is probably true; indeed the figure given is believed to leave a wide margin of safety for X rays. But so long as some doubt remains as to the difference in biological effect of the more penetrating radiation, it is to be hoped that every effort will be made not to exceed it for gamma rays.

With a view to preventing excessive exposure to X rays of technicians in therapy departments a method of remote control of the shutter is recommended, together with an interlocking device of some kind for the filter, and protective screens in applicators. A significant point made in this section is that full protection should be provided in all those directions in which the direct beam could operate dangerously.

The minimum equivalent thickness of lead for protection from X rays generated at different voltages is given, with interesting new data on the protection suggested for high-voltage installations. The difficulty of measuring the output for such apparatus is a problem similar to the measurement of gamma rays, and the tables on equivalent thicknesses of lead and other materials prepared by the National Physical Laboratory for both forms of radiation will be most useful to all those responsible for construction of rooms to house beam therapy and high-voltage apparatus. The only really safe method of handling large quantities of radium is by remote control, which introduces the radium into the container only after the latter has been adjusted to the patient. Now that beam therapy is being used in many hospitals, careful regulation is needed. In diagnostic work the chief danger is in fluoroscopy, and the introduction of a limiting device on the primary side of the apparatus to guard against excessive tube current during examination is another recommendation.

The prevention of accidents due to electric shock has been simplified by the almost universal use of shock-proof apparatus, but the application of non-shock-proof tubes in circuits excited by transformers operating with the mid-point of the secondary winding earthed is condemned, and attention is drawn to the risk of shock from alternating current mains, particularly three-phase installations and auxiliary equipment in dark rooms.

Two further important new recommendations, which are worthy of note, are the specification of the ventilation which should be provided in all X ray rooms, and a suggestion for the transmission of radium by post.

This report will be welcomed as a concise and complete account of the precautions necessary to protect radiological workers, and together with the National Radium Commission's publication on "The Care and Custody of Radium," is a complete guide to those responsible for the prevention of unnecessary risk to health.

LONDON HOSPITAL.—The quinquennial appeal of this hospital falls due this year and its bicentenary in 1940. It has therefore been decided to hold a combined appeal over a period of three years which will be opened by a festival dinner to be held on May 25th at the Mansion House. A scheme of extensions and improvements which will cost £300,000 is contemplated.

PROPOSED EXTENSION OF THE PHARMACOPŒIA

A COMMITTEE of the Pharmaceutical Society has had under consideration for some time past a list of proposed additions and deletions circulated by the British Pharmacopœia Commission. There is a tendency among manufacturing druggists to regard formulas in the Pharmacopœia as more binding than those in the Codex. At the present time there are many Codex formulas which are not accepted by some manufacturers, who continue to supply alternative preparations. Thus compound syrup of hypophosphites is being supplied containing no strychnine, and Easton's syrup tablets frequently correspond in strychnine content with the B.P. 1914 formula for the syrup and therefore contain twice the proportion specified in the Codex formula, which corresponds with the B.P. 1932 syrup. The transference of a preparation from the Codex to the Pharmacopœia results in the elimination of alternative formulas and ensures uniformity of composition. The committee of the Pharmaceutical Society therefore held it desirable that the B.P. 1941 should include as many formulas as possible for preparations commonly required by prescribers and the public. A further recommendation of the committee is that, since practically the whole output of many drugs such as aspirin and phenacetin is in the form of tablets, standards for these tablets should be included in the Pharmacopœia. After consideration of the report the council of the Pharmaceutical Society agreed to inform the Pharmacopœia Commission of these views and also to recommend that certain items, the omission of which from the Pharmacopœia was contemplated, should be retained; among the items in question are amidopyrine, dehydrated alcohol, dilute hydrobromic acid, the cinchona preparations, and potassium nitrate.

Following the submission of these recommendations a delegation from the Society met representatives of the Commission for the purpose of discussing the proposals more intimately. The Commission, we understand, is prepared to include in the Pharmacopœia an increased number of preparations of drugs of proved therapeutic activity, but not to include preparations solely on the ground that they are widely used. The list of preparations which the Society's committee proposes to suggest contains about one hundred items and comprises uncompounded drugs, elixirs, emulsions, extracts, injections, liniments, ointments, pills, suppositories, tinctures, tablets, and a number of miscellaneous preparations. The reason which has prompted these suggestions is that the methods of assay given in the pharmacopœial monographs for single drugs may not be applicable to preparations of these drugs; this is especially the case where interfering substances are present such as some of the lubricants used in the manufacture of tablets—e.g., stearic acid and cacao butter.

There is a recent precedent for the official recognition of tablets—namely, their inclusion in the Swiss Pharmacopœia, and while the revised edition of the French Pharmacopœia (Codex medicamentarius gallicus) which will become official on April 1st next does not specify tablets, it does contain a general monograph which describes how tablets should be made, lays down a test for disintegration, and limits the weight variability to 5 per cent. In view of the great and increasing extent to which compressed drugs are prescribed and supplied the Pharmaceutical

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Society's committee is of opinion that the next edition of the British Pharmacopœia should provide standards more detailed than those of the Swiss Pharmacopœia and the French Codex and should specify size, shape, weight, and even colour.

In general the principle which underlies the Society's proposals is that since the British Pharmacopœia is regarded as a presumptive standard under the Sale of Food and Drugs Acts, it is desirable to include in it as many of the commonly prescribed preparations as possible. This would mean a more bulky work than the present one, but not so bulky as the new French Codex which is in two volumes and the index to which alone contains one hundred pages.

THE REGULATION OF MEDICAL PRACTICE IN AUSTRIA

(FROM OUR VIENNA CORRESPONDENT)

THE Government has just passed a new law regulating every legal aspect of a medical man's professional life; it will come into force on May 1st. The measure is the fulfilment of a series of demands made repeatedly by the profession for the last 40 years, and it finally settles many of their legal and professional problems. The present regulations date from over a century ago, and were only adapted bit by bit to later requirements, with unsatisfactory results. The new law leaves the subject of medical ethics for a special committee, which will be appointed by the representative medical bodies of all Austria, and will have to work out the code of moral obligations of doctors to each other and to the public.

The "Aerzte-ordnung," as the new law is termed, is divided into five parts. The first part defines for the first time in Austrian legislation "the medical profession," and enumerates the conditions required for the right to practise. The definition says that practice of medicine comprises curative treatment of diseased persons, diagnosis and giving of expert opinions on diseased conditions, prophylaxis, prescription of remedies for prophylactic, therapeutic, and diagnostic purposes, and for removing the ailments of the human body. (It thus does away with the difficulties of prescribing narcotic drugs, as mentioned in my Vienna letter of Dec. 4th, 1937.) The diagnostic or therapeutic application of X rays is expressly reserved for the medical man. Medical practice is reserved exclusively for qualified persons who must have the following: Austrian federal citizenship, a certificate of having passed the "Matura" examination before the year 1918 in one of the provinces of the former Austrian Empire, or after 1918 in the present Austrian State, or a diploma of M.D. obtained either in the old Empire or in the State. A "Matura" testimonial or a medical diploma conferred abroad is valid only if it is equivalent to one obtained in Austria and afterwards recognised in this country or in the old Empire. Furthermore, inclusion in the medical register is absolutely essential. The doctors already entitled to practise are required to register afresh within the six weeks after May 1st. Clinical assistants who cannot comply with these requirements—Austrian citizenship and a duly recognised diploma—are not allowed to practise except in their official appointments. Of course there is no objection to calling in a medical man from abroad for consultation, or to doctors from abroad taking up their studies in an Austrian hospital, but they must refrain from private practice.

The second part of the ordinance deals with the rights and duties of the "Arzt." This denomination is reserved strictly for those complying with the stated requirements. No other person may assume a similar title, such as natur-arzt, magnet-arzt, homœopathic arzt, or publicly use titles obtained abroad, unless permission is obtained. The designation "Facharzt" (specialist) will be conferred on those entitled to it by an ordinance shortly to be promulgated. Hitherto the local medical board has had a free hand in the styling, but the procedure will now be uniform. No doctor may practise regularly in more than one locality—i.e., there must be a single address. He must notify his consulting hours, and he may not see patients regularly in another office unless he holds an official appointment necessitating his presence in different places. Of course any doctor may act as locum tenens for certain periods and thus practise in two different localities without special permit, or he may see patients in consultation in any place. Seasonal changes in the place of practice—for instance by spa physicians—for a period not exceeding six months are permitted. The essential point is that no one is allowed to practise at will, now here, now there. The doctor must have a permanent address and must notify any change at once to the local medical board. He must not refuse to give first aid, unless very important obstacles prevent him. He must treat his patients conscientiously and give them the benefit of recognised scientific knowledge.

There is an important new departure in the law on professional secrecy. The principle of strictly confidential relations must be maintained, as hitherto, between doctor and patient. But the revelation of knowledge obtained in the course of professional work is legitimate and a moral duty if important public or private interests are involved. The doctor himself must weigh carefully the factors for and against. Many consider this possible disclosure of professional secrets as a serious and significant drawback of the new regulations. They were much more satisfied with the former etiquette that made professional secrecy an inviolable, absolute professional obligation. The doctor must not issue any certificate of illness or legal testimony not in accordance with the true condition, but if he gives a certificate he must state in it the purpose for which it is issued. Every consulting-room must bear a descriptive doorplate, which must be removed if the owner discontinues his practice for any reason whatever, and in this office the doctor must keep in store certain remedies for first aid, according to the type of practice. A doctor's name may be struck off the register permanently or temporarily. This may take place if he loses his Austrian citizenship or because of mental disability, or if he is deprived of his academic degree by a court of justice or an administrative magistrate. Temporary removal from the register may for instance be imposed on the doctor if he is guilty of serious malpraxis, and he may be ordered to submit to an examination in certain subjects before he is readmitted. An interesting clause stipulates that habitual inebriety and drug addiction may entitle the authorities to remove the victim from the register for varying periods or permanently.

The section dealing with the penalties for unqualified practice imposes a fine not exceeding 2000 shillings or imprisonment up to three months. This is a very important clause for it gives, for the first time in this country, an opportunity to combat quackery.

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Hitherto this evil could never be eradicated, since the law required the proof of a regular, paid occupation, and the quacks were clever enough to slip through the wide meshes of such a net. Now they need not be summoned before a court, but can be sentenced by the local magistrates. The profession has received this new regulation with uniform satisfaction.

The last part of the ordinance describes the arrangements for the time of transition from the old regulations to the new, and deals with the regulations concerning the new medical register. It defines the rights and duties of the controlling medical body, the "Aerztekammer," as the only legal representative of the medical profession which will exercise a direct control of the ethical and moral standing of all men practising in Austria, thus ensuring real self-government by the profession, but as well it will defend and protect them against attacks and injury.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

A FORWARD LOOK AT NATIONAL HEALTH

SPEAKING on March 1st in Baltimore on the above subject Surgeon-General Parran restated emphatically the enlarged programme of public health administration which he advocates. The maintenance of health is not enough. Any disease which is widespread and which requires treatment beyond the means of the sick constitutes a public health problem. How, he asks, shall we face this problem in the immediate future? The gap between the acquisition of medical knowledge and its application is becoming smaller and will continue to decrease. Three factors contribute to this tendency:

(1) There is increasing concern in the welfare of the unfortunate members of society.

(2) There is increasing interest among lay individuals in medical discoveries and increasing confidence in the ability of medicine to serve human need.

(3) There is increased realisation of the financial stake which the community has in the preservation and restoration of good health.

The recent nation-wide survey and interdepartmental report have contributed to the wider understanding of the vicious cycle of poverty, ignorance, and disease. Public health is dynamic: to be satisfied with past progress is to regress. The federal government has made a start with the Social Security Act. While the federal government, however, contributes about 50 per cent. of the cost of old age pensions it contributes only some 10 per cent. of the cost of public health administration. Much is left undone. Dr. Parran cited several examples of neglect, among them the fact that in only two States is anything more than a gesture being made to prevent deaths from pneumonia with the new weapon of serum therapy.

In the immediate future, he continued, the federal government can—

(1) offer assistance on the basis of relative need in developing a real national health programme, building on the skeleton of existing health organisations, and wherever necessary creating new health organisations,

(2) assist in providing the physical facilities for medical care: hospitals, health centres, and so forth,

(3) assist in providing medical care to those who can afford to buy it.

In addition two further steps may be desirable. These are compensation for loss of wages through sickness and health insurance. Regarding the latter, Dr. Parran expressed the view that the more complicated becomes the provision of medical care (with the advance of knowledge) the less efficient is health insurance as a means of providing it. Health insurance may come but not, he believes, in the proximate future.

In concluding, Dr. Parran expressed his belief that the near future holds promise not only in diminishing the gap between our knowledge of what should be done and application of this knowledge, but also a great increase in medical knowledge. As each new weapon is forged the public will insist that it is promptly put to work.

TYPHOID CARRIERS IN NEW YORK STATE

There were 398 typhoid carriers under supervision in up-State New York, exclusive of those in State institutions, at the close of 1937, 18 more than were under supervision at the end of the previous year. That gives the State, exclusive of New York City, a rate of 0·66 per 10,000 population. During the year 43 new carriers were declared, while the names of 30 others were removed from the register. Of the carriers, 29 were discovered through epidemiological investigation of sporadic cases or outbreaks, 11 were found through the requirement of release cultures from cases of typhoid fever, 2 were discovered on evidence submitted by health departments outside the jurisdiction of the State Department of Health, and 1 was discovered accidentally. Of those patients who had onset of typhoid fever during 1936 and survived, over 4 per cent. were discovered to be chronic typhoid carriers. Of the 30 carriers whose names were removed from the register, 12 died. Seven were released from restrictions after submission of the required number of negative specimens, and 10 were removed because of change of residence to a community outside the State. One carrier was committed to a State institution. During 1936, 7 chronic typhoid carriers underwent operations in order to relieve their carrier condition. Three of these 7, however, continued to submit positive specimens last year and they remain unreleased. Three outbreaks of the disease during the year were traced to previously unrecognised carriers. An outbreak of 13 clinically recognised cases occurred in Schenectady in June and July of last year among 33 persons who had attended a Memorial Day luncheon. A woman, subsequently found to be a chronic typhoid carrier, had prepared salads which were served at the luncheon. Collected evidence pointed to these salads as the probable vehicles of infection. In Dutchess County 12 cases of typhoid fever occurred in January, 1937. The outbreak was shown epidemiologically to have been spread by raw milk and a chronic typhoid carrier was discovered among the milk handlers. Three cases occurred on a small raw milk route in Genesee County in August. A chronic typhoid carrier was discovered to be washing milk utensils on the dairy farm. During the year 9 cases of typhoid occurred which were believed to have been caused by previously known carriers. Of this number 5 were among household contacts of carriers. Four of these 5 patients had never been immunised; the fifth had been immunised ten years previously.

CONTROL OF PSITTACOSIS

Believing that the control of psittacosis can be achieved only by the suppression of psittacine birds as domestic pets, the public health council of New York State adopted on Feb. 18th last the following amendment to the State sanitary code: "The

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importation, breeding or sale of birds of the psittacine family is hereby prohibited, provided, however, that the importation and breeding of such birds for scientific research or exhibition in public zoological gardens may be permitted subject to the approval of the state commissioner of health." This regulation was to take effect on the 1st day of March, 1938.

IRELAND

(FROM OUR OWN CORRESPONDENT)

REPORT OF THE HOSPITALS COMMISSION

THE second report of the Hospitals Commission—the body that advises the Minister for Local Government and Public Health on the distribution of the sweepstake funds—was published last week. The first report, published early in 1936, dealt mainly with 1933 and 1934, and the present report covers the next two years. Both do much more than detail the work done in the periods with which each deals, for the main object of the Commission is to plan an efficient hospital system for the country, and consequently it is concerned with the future as much as with the present. The new report has apparently been in the hands of the Minister for some time, since some of the matters on which he has now given decisions seem to have been still sub judice when it was written.

Like its predecessor the report gives a useful and understanding conspectus of the present hospital provision of the country, and well thought-out recommendations for future development. No doubt opinions will differ on the value of some of these, but every praise is due to Mr. M. W. Doran, chairman of the Commission, and to his colleagues, for the broad and long views they have taken of the problem with which they had to deal, and for the sympathetic consideration they gave to all representations made to them. The Commission repeats its recommendation in favour of a special development of the Dublin voluntary hospitals, to which the Minister's approval has recently been given. The necessity is stressed of closer coöperation both among the voluntary hospitals themselves and between the voluntary hospitals and the rate-supported, and examples of the ways in which coöperation would be both practical and helpful are quoted. The Commission welcomes the attempt made recently to form a hospitals association, but does not seem to be aware that this attempt has been checked if not frustrated by the opposition of the Minister's department. For the first time in a public document in Ireland one finds a reasoned attempt to distinguish the functions of the voluntary hospitals from those of the rate-supported institutions. The failure to recognise this distinction earlier led to a considerable waste of public money in the past ten or twelve years, a waste for which the Commission is in no way to blame.

Important recommendations are made about the development of special hospitals and services. A special chest hospital is advised for Dublin which should deal with the surgical as well as the medical treatment of pulmonary tuberculosis, and chest units should be included in the general regional hospitals of Cork and Galway. They would work in close coöperation with the several sanatoriums. In addition a hospital for non-pulmonary tuberculosis should be provided for Dublin. The problem of rheumatism is considered, and it is suggested that the facilities available at spas should be made available in the large centres of population by improved equipment of the physico-therapeutic departments of the hospitals. No doubt this is desirable, but it is very far from a solution of the problem. In regard to the treatment of mental diseases the Commission notes the need for mental clinics for early cases of disorder, and draws attention to the necessity for revising the lunacy laws. The Commission has undertaken an investigation into the incidence of mental defect and of epilepsy not associated with insanity. New statutory power will probably be required to enable the problem of mental deficiency to be solved. Among the most notable grants recommended by the Commission in the period under review are: National Maternity Hospital, Dublin, £89,180 for building; Rotunda Hospital, £107,474 for increased bed accommodation and reconstruction; the Coombe Hospital, £5000 for temporary additional accommodation; and a Hospital Library Service, £10,000.

MEDICAL CANDIDATES FOR THE SENATE

The Senate elections, both for those to be elected from the vocational panels and for those to be elected by the Universities, are now in process, and must be completed in the last week of the month. The Royal College of Surgeons in Ireland, being the only medical body to which was granted the privilege of nominating to the vocational panels, has taken its responsibility in a broad sense, and has nominated, in addition to one of its own fellows, a distinguished fellow of the Royal College of Physicians. Its nominees are Mr. R. Atkinson Stoney and Prof. T. Gillman Moorhead, past presidents of their respective colleges. In Dublin University Dr. Robert J. Rowlette, who was one of the University representatives in the Dáil since 1933, is one of the four candidates for three seats. Of the five candidates for three seats in the National University two are medical men—Mr. H. L. Barniville, a member of the former Senate, and Mr. Charles MacAuley. Both are members of the teaching staff of University College, Dublin, and they are colleagues as surgeons to the Mater Misericordiæ Hospital. It seems unlikely that the Senate will be left without at least one medical man among its members.

WIRELESS COMMUNICATION WITH AMBULANCES.—A new radio ambulance service has been started in Sydney, New South Wales, which will enable officers at ambulance headquarters to converse with men on cars as far away as forty miles. Not only will calls be answered more quickly but the rapid communication will make it possible to warn doctors, nurses, and hospitals about cases presently needing their care. The transmitter at headquarters has a power of 200 watts, and each car has a 10-watt transmitting set.

ROYAL MEDICAL BENEVOLENT FUND.—At a recent meeting of the committee three annuities and thirty-four grants were awarded. The total amount voted was £995.

One of the recipients was a doctor whose grant was renewed for the fifth year in succession. He is married and has one child of school age, and is quite unable to practise owing to paralysis. In his letter of acknowledgment he says: "It has not been possible owing to my paralysis for me to write to you before, but now I have a typewriting machine on which I can tap with one finger of my left hand. It gives me great pleasure to address you personally. I am truly grateful for all the Fund has done in the past and is doing at the present time on my behalf. The Fund is truly a marvellous Society. I do not like to think what our position would be without your magnificent help. I beg you to convey my own, and my family's, most sincere thanks to the Committee."

Subscriptions and donations are urgently needed and may be sent to the hon. treasurer of the fund, 11, Chandos-street, London, W.1.

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GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM VRATCH

II

CLINICAL work is much the same the world over because the response to physical disease is little affected by race or climate; but the doctor's work is greatly affected by the social conditions, the administrative complexity (or over-simplicity), and even the climate in the area of his labours. Sometimes difficulties arise from issues quite outside the proper limits of medical activity.

When I was acting as a county council doctor in Russia (old régime) I had to cover single-handed an area about the size of Surrey and a population of at least 50,000 of half a dozen different races. The problem was to distribute the small amount of medical aid where it would be most effective and was most needed, irrespective of other considerations. A few outlying clinics were established (at about twenty miles from the central hospital) which I visited on weekly rounds so as to save patients the burden of travel; they were placed after careful consideration of the population and general healthiness of the neighbourhood. To prevent unnecessary delays I stopped at villages en route to these clinics only if I had previous notice of illness that must be seen at home, or if more than a handful of out-patient cases was reported.

* * *

One route passed through a small village of independent colonists from Little Russia, people of vigorous disposition and, as it happened, good bodily health. The Headman of the village, who had seen me drive through several times, requested me to place a clinic in his village, but I declined on the ground that his village was small, quite near another clinic, and, above all, remarkably healthy. He offered to provide a room free: "And would you," I asked, "let me see all comers there?" "We certainly would not, it would of course be for our own people!" It would be a disgrace, he added, for his villagers to mix themselves with the ordinary peasants among my out-patients; his people were above such mud and desired special consideration. He admitted that one of his chief reasons for wanting the clinic was prestige, as he had promised his villagers that he would obtain it. I refused on the ground of medical urgency elsewhere.

The next time I drove through on my round I noticed an unusual number of dogs barking, and realised that they were being set on us. The horses, though frightened, kept up a good pace. One of the wolf-like beasts nearly got on to the sledge, but having to run after us it did not quite manage the final leap. Shortly after I received a note from the Headman. Would I open a clinic? I again refused, and resolved next time to go through his territory prepared. A week later my driver asked if I would not make my round by another way; but this I would not do, and we set out.

* * *

There are few things pleasanter than a sledge drive across the Steppe on a sunny morning. There is a sting in the air, the snow under the runners squeaks crisply, and the muffled thumping of the horses' feet and the rocking of the sledge over the undulating ground produce a peaceful contentment. The best kind of sledge is one with a level floor big enough to hold a truss of hay, which, skilfully spread out and covered with sheepskins, is more comfortable than any contrivance of seats and springs. By jamming one's feet in one corner, sprawling diagonally across the sloping mound of hay and bracing one's shoulders into the opposite corner of the back one can by a quick stiffening of the body grip the sledge, as it were, when it crashes into a deep bump or heels over on an incline, and one's arms are free to be tucked into the long sleeves of the sheepskin outer-overcoat. The shaft horse is attached only at the collar, the shafts being kept very wide apart by the great arch of wood on which the bells are hung. The traces of the leading horse are long enough to leave eight or ten feet between the leader's tail and the shaft horse's nose, so that the leader can swerve round bumps and pot-holes and pull the forward end of the shafts into the right direction. This also permits the leader to pick a good surface by allowing him a wide lateral range of movement. But the leader must have good nerves, for if he runs wild the sledge will crash, the shafts be broken, and the curved-up front of the runners may break the shaft-horse's legs. The distance between the horses necessitates two whips, one with a thong about 6 ft. long for the near animal, and one about 30 ft. long for the trace-horse. These whips dangle from the driver's wrists, and their long thin strands of twisted leather ride over the snow with an arching and rippling movement like attendant serpents keeping pace on either side of the sledge.

* * *

On this morning our horses slowed down at a hill and rested at the top. Below us lay the village we must pass through. The wall and fence that surrounded it were banked up into sloping ramparts of snow, cut by the road that passed through the middle of the village, which was guarded by a gate at either end. It was a quiet scene and I noticed that both gates were open. The driver started the horses and we raced down the hill at a full gallop. He went through the first gate superbly, and we were doing the quarter mile of village street at a speed and in a style that Russians love. When we had gone part way through the village they let the dogs loose. This time the dogs bore down upon us from the front so that they had the advantage of a springing attack. They worried the horses, which slowed down enough to make it possible for the brutes to jump full on me and to get over the back of the low-built sledge. I had disconnected the two portions of a cranioclast and held them in readiness. I got up and, standing by the driver, dealt with those that came upon us from the sides, while he with the whips tried to keep them clear of the horses. Then, to my surprise, the villagers, who had stood and watched the scene, whistled to their dogs; this caused a momentary distraction which allowed the horses to spring into a gallop.

But the villagers had not done with us yet. There was the second gate to shoot through, and some of them standing nearby released more dogs at us from the flank in order to head the trace-horse up the rise of snow that had banked up to the level of the top of the wall, where an overturn would have been inevitable, and a ghastly mauling by dogs a certainty as we floundered to our feet. The horses were in

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panic, the sledge was swerving from side to side of the road, but by masterly driving they were kept off that dreadful slope, and we made a clean exit through the open gate.

The rest of the day was uneventful.

* * *

Some weeks later I was called from supper. Would I go *at once* to a desperately ill woman? A fast sledge had been sent for me and the village was only twelve miles away. Without thought or discussion I stepped into the sledge, and was driven off at a fine spanking pace. I soon saw that the route lay towards that village. Then I noticed little details: the carriage of the driver's head, the cut of his coat, the shape of the sledge—all seemed familiar and yet made the pattern of a culture that was different from the usual one in my neighbourhood, and I realised that I was going not through but *to* that village.

We drew up at the Headman's house and I was led straight to his mother who was certainly very ill with pneumonia. I did what could be done about diet, explained about nursing, and then wrote a prescription to be made up at my hospital. As soon as that was done the Headman said "And now about that clinic!" I told him the answer was the same, and further that to set dogs on doctors was not the way to get a clinic. "Very well," he said, "if you don't consent you can get home by yourself, my horses shall not take you and I am not going to be responsible for what the dogs do to you." To his shame this was said in his mother's hearing. I saw only one way out of the difficulty, apart from agreeing to set up a clinic where he wanted it and not where it was needed. Acting instantly on the knowledge that a prescription is regarded by these people with superstitious reverence, I replied, "The burden of that decision falls on other shoulders" and tore the prescription to pieces. To my shame this also was said and done in the patient's presence. He took the dreadful blow to his mother with steadiness and said quietly that I had beaten him. I immediately promised to send the medicine at once on my return to the hospital if he would have me driven back and no more dogs were set on me. I said I would visit serious cases in his village as I was doing at that moment and would stop on my way through if requested in the customary way; but no clinic, and no more dogs. He kept his bargain and I mine. I do not know what happened to his prestige.

* * *

These hardy, independent people were a fine set of men, if somewhat rough. It is a misfortune for which individuals are not to blame that when an aggressive attitude towards life finds outlet in communal action the leaders of the group are often rich in cunning, though poor in wisdom. The people I have described had different but equally admirable qualities from the more numerous, more lazy, more gregarious village-peasants of Great Russia; unfortunately the two types did not get on well together. The world now knows such sturdy independent farmers, in the heart of Soviet Russia, by the name of *Kulaks*, and I for one who saw something of their mettle regret, but nevertheless can understand some of the reasons for, their liquidation.

PUBLIC HEALTH

INFECTION AND EXCLUSION FROM SCHOOL

AT a discussion on infection and disinfection held by the Society of Medical Officers of Health on Feb. 18th, Dr. Hugh Paul of Smethwick developed what he termed the "rather revolutionary thesis" that healthy children who have been in contact with others suffering from infectious disease should not, for this reason, be automatically excluded from school. Exclusion, he holds, should only be enforced in the extremely rare event of a school medical officer or practitioner finding some special reason to justify the step. Dr. Paul's suggestion is intended to apply only to urban areas with "dense aggregations of more or less working-class populations" and not to rural districts or "to prisons or institutions where discipline can be enforced from above or large public schools where money is no object." Thus, closed or semi-closed communities are excluded from his remarks and neither prisons nor opulent public schools, if such exist, need here be considered.

Although for nearly a year, he tells us, Dr. Paul has practised in a crowded industrial area what he now preaches, he notes that even in such an area expediency may dictate exclusion, and he admits that with small-pox expediency would govern his own procedure. He reminds us that children are excluded from school for three reasons: (1) they are actually suffering from some disease, infectious or otherwise; (2) they have been in contact with somebody suffering from an infectious disease; (3) they live in a house in which there has been an infectious patient. He appears chiefly to have in mind children who have been exposed to diphtheria or scarlet fever; he does not mention measles, or that in London anyhow, since 1934, home contacts with measles have been allowed to attend school "provided that arrangements can be made for their examination daily by the school nurses, the children concerned being also kept under observation by their teachers."[1] The reasons given for the adoption of this policy by the London County Council were that "apart from the effect upon school attendance, it is reasonable to assume that the attention of the borough medical officers of health was drawn to cases of measles earlier than if they had been excluded from school and since pre-school children are more severely affected by an attack, if contacts are permitted to attend school they are less likely to infect the younger children at home." Since children must go home to sleep, probably under crowded conditions, this last point may not be a very cogent one; but the conclusion reached and acted upon in London, that there are advantages in healthy contacts remaining in attendance at school provided that they are kept under careful supervision, shows that Dr. Paul's proposals are not so revolutionary as he supposes. Now measles is an intensely infective disease with a fairly long incubation period and, during its epidemic phases at least, one which occasions a fatality-rate equal to those of diphtheria and scarlet fever combined. On the other hand, diagnosis, especially if a history of contact is forthcoming, is easy, and although, as has been shown by P. Stocks and by J. L. Halliday, subclinical infections resulting in temporary latent immunisation occur, carriers of measles, other than transient or contact carriers of the virus, are unknown. It is true that diphtheria and scarlet fever have short incubation periods; they are far less infective than measles, close or repeated personal contact

[1] L.C.C. Report on measles epidemics, 1933–4. No. 3180. London, 1936, p. 9.

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being necessary for transmission, but *formes frustes* are of frequent occurrence and clinical diagnosis is not possible for teachers or school nurses and, without bacteriological assistance, may even be difficult for the doctor; chronic carriers abound. The suggestion has never been made that the hospitalisation of measles is a preventive measure of any value; that the hospitalisation of diphtheria and scarlet fever would diminish incidence was at one time hoped, but the hope has not been realised. The continued prevalence of these diseases, in spite of a high isolation-rate, is due to the occurrence of *formes frustes* and to the existence of carriers far outnumbering cases clinically recognisable. The detection here and there among the open community of healthy carriers of the diphtheria bacillus or the hæmolytic streptococcus and their segregation is labour in vain, since these measures cannot affect prevalence, and indeed the presence of healthy carriers in the community tends to maintain herd immunity. Assuming that the infecting clinical case of diphtheria or scarlet fever is effectively isolated at home or removed to hospital, is there any point in excluding familial contacts from school for the traditional quarantine periods? This depends upon whether expediency —i.e., pressure of public opinion—or control by modern methods is to govern the situation. In a children's ward it is possible by means of the appropriate intradermal tests, swabbing for the detection of carriers, and passive immunisation of positive reactors to control an outbreak of diphtheria or scarlet fever and to readmit fresh patients within 48 hours or less. Whether such measures applied to familial contacts are feasible and, if so, expedient, is a question for individual medical officers of health to decide; but even without them, there is much to be said for Dr. Paul's practice. Considering the numbers at risk and the conditions under which these risks are run in crowded tenements, multiple familial cases of diphtheria and scarlet fever are remarkably few. They are not likely to be more numerous if the child, under daily supervision, attends school, especially if the appropriate modern methods of specific discrimination and control have been previously carried out in his home. It is better for the child to attend school than to play with his friends in the street. Any idea that the excluded child is really segregated by the mother may, as Dr. Paul points out, be dismissed. Every general practitioner is aware that in the average working-class home such segregation is impossible.

Appropriation of L.C.C. Institutions

Six public health institutions under the London County Council have not yet been appropriated for the reception of the sick—namely, Fulham, St. Alfege's, St. Mary Abbots, Hackney, St. Leonard's, and St. Pancras. During the next few weeks the remaining able-bodied and healthy inmates will be transferred to public assistance establishments and by April 1st the appropriation can be effected. The council will then have removed its hospital service entirely from the ambit of the Poor Law. After appropriation these institutions will form part of the adjoining hospitals.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED FEB. 26TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2429; diphtheria, 1565; enteric fever, 18 (30 "expected"); pneumonia (primary or influenzal), 1188; puerperal pyrexia, 188; cerebrospinal fever, 29; acute poliomyelitis, 6; acute polioencephalitis, 1; encephalitis lethargica, 4; dysentery, 214; ophthalmia neonatorum, 115. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on March 4th was 5008, which included: Scarlet fever, 819; diphtheria, 1277 (carriers 41); measles, 1542; whooping-cough, 277; puerperal fever, 15 mothers (plus 8 babies); encephalitis lethargica, 284; poliomyelitis, 1. At St. Margaret's Hospital there were 32 babies (plus 12 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there were no deaths from small-pox, 1 (0) from enteric fever, 50 (13) from measles, 2 (0) from scarlet fever, 16 (2) from whooping-cough, 34 (3) from diphtheria, 66 (22) from diarrhœa and enteritis under two years, and 59 (11) from influenza. The figures in parentheses are those for London itself.

Barking reported the only death from typhoid. Birkenhead, Salford, Wigan, and Bristol each had 3 fatal cases of measles. Birkenhead also reported 6 deaths from whooping-cough, Liverpool 3. Diphtheria was fatal in 21 great towns, Liverpool reporting 4 deaths, Manchester and Birmingham each 3.

The number of stillbirths notified during the week was 267 (corresponding to a rate of 37 per 1000 total births), including 36 in London.

THE LANCET 100 YEARS AGO

March 10th, 1838, *p.* 871.

A petition to the House of Lords on the abolition of imprisonment for debt.

The humble Petition of the British Medical Association, Showeth—

That the Bill now before the Committee of your Lordships' House, intituled, "An Act for extending the Remedies of Creditors against the Property of Debtors, and for abolishing Imprisonment for Debt, except in certain Cases of Fraud," will, if passed (in its present form) be most injurious in its effects to the members of the medical profession:

That medical men are very differently circumstanced from other persons as to the mode in which credit is often obliged to be given. Members of the legal profession, merchants, tradesmen, &c., have it in their power to exercise due discretion as to whether they will give credit or not, by first inquiring into the character and circumstances of the parties, and as to their probable means of payment; whereas it is well known that your Petitioners are called upon to attend sudden and urgent cases, admitting of no delay, and which it would not only be inhuman in them to refuse, but such refusal would subject them to considerable odium and disgrace:

That there is in London, and in most of the large towns in England, a very extensive class of persons who, under the above circumstances, may contract debts, and yet are wholly exempt from the remedies which by the Bill are intended to be given to the creditors against the property of their debtors, namely, clerks in Government and public offices, warehousemen, mechanics, and other artisans, whose salaries and incomes are considerable, but who possess no tangible property which, under the provisions of the projected Act, could be assigned for the benefit of creditors:

That your Petitioners, under the existing law, sustain losses greater by far, in the aggregate, than persons unacquainted with the facts could well imagine, and which losses they believe would be much increased if the present Bill should pass into a law in its present form:

That with the view of meeting the increased risk which the abolition of imprisonment for debt must necessarily produce, your Petitioners humbly beg leave to suggest to your Right Honourable House, that it may be made competent for a judge, on the application of a judgment creditor, to order that so much of the salary, wages, or income, of the debtor, shall, from time to time, be appropriated in liquidation of the judgment debt, as to such judge may seem fit and proper, or that your Right Honourable House will be pleased to make such other provision for carrying into effect the desires of your Petitioners, as to your Right Honourable House may seem most expedient.

And your Petitioners, as in duty bound, will ever pray, &c.

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CORRESPONDENCE

GAS-AND-AIR ANALGESIA

To the Editor of THE LANCET

SIR,—I have read the letter from Dr. J. Elam in your last issue with great interest, and I wholeheartedly agree with him about the importance of attention being paid to small details. In my experience inadequate analgesia has only resulted in those cases in which some error of technique has been committed by an attendant not thoroughly conversant with the method. The course of instruction that institutions approved by the Central Midwives Board are now giving to midwives and pupils, followed by an examination to test their proficiency, should ensure that patients receive the best available relief. The Liverpool Maternity Hospital provides a course which is very thorough, and I would have every confidence in anyone who obtains a certificate after examination in obstetric analgesia from this hospital. Messrs. Baillière, Tindall and Cox will shortly publish a small book for me on gas-and-air analgesia, which ought to be a great help to medical practitioners and midwives who are interested.

I am, Sir, yours faithfully,

Liverpool, March 5th. R. J. MINNITT.

To the Editor of THE LANCET

SIR,—In your issue of March 5th Dr. Elam describes methods of increasing the efficiency of automatic "gas-and-air" machines for obstetrical analgesia. His views are of considerable interest to me, for a year ago (*Lancet*, 1937, **1**, 615) I attempted to analyse the reasons for the erratic effect of these machines, and suggested a means whereby a more efficient analgesia could be obtained which more nearly coincided with the time of onset and duration of a labour pain.

Dr. Elam's observations are of considerable importance, and, in particular, I agree that the efficiency of the analgesia can be increased if the patient continues to inhale the gas mixture in the intervals between her pains. In my experience, however, I have found that it is difficult to persuade the patient to do this—often, indeed, it is even difficult to induce her to make the necessary inhalations *during* a pain, especially when the bearing-down reflex becomes strong.

It is also true that an increased efficiency can be obtained if the proportion of nitrous oxide inhaled is increased to 60 per cent. Dr. Elam states that he is quite sure that no ill effects can result from using a mixture of this strength, but until this claim is supported by strong evidence, a prolonged reduction of oxygen intake from 20 per cent. (as in normal air) to 8 per cent. must be regarded as a serious matter. The resulting anoxæmia can scarcely be beneficial to the mother, and if it is maintained during the actual delivery, must surely be prejudicial to the safety of the fœtus.

If Dr. Elam's line of reasoning is continued, one might use inhalations of pure gas in order to get a quick and pronounced analgesic effect. This is the method which I have previously recommended; safety from asphyxia can be obtained by a device which prevents the inhalation of more than 110 ounces of gas (2 or 3 deep breaths) at one time. Such an apparatus has been made for me by Messrs. A. Charles King and Co., and was described in the article mentioned above. Both portable and standard models are now available. Provided that the patient has sufficient self-control to take three deep breaths at the first warning of each renewed pain, a useful degree of analgesia can be guaranteed. Continued experience has convinced me of the value of this method, and I am satisfied that the results are distinctly superior to those which I can obtain by use of the usual gas-air mixture.

In a recent annotation (*Lancet*, Feb. 26th, 1938, p. 508) you mention my method but imply that it is not suitable for use by midwives. It is true that no effort has yet been made to bring the new machine to the notice of the Central Midwives Board, but it is wrong to suppose that it is unsuited to the needs of domiciliary midwifery. When the precautions are observed on which the Central Midwives Board insists with regard to the gas-air type of apparatus, the new machine is at least as safe, and is, I believe, simpler and considerably more efficient in use.

I am, Sir, yours faithfully,

CHASSAR MOIR.

Department of Obstetrics and Gynæcology, University of Oxford, March 7th.

MATRIMONIAL CAUSES ACT: THE DOCTOR'S EVIDENCE

To the Editor of THE LANCET

SIR,—The first cases under the new Matrimonial Causes Act will shortly come before the courts, and medical practitioners being to some extent affected by the provisions of the Act, it is interesting to examine the position. Evidence from medical practitioners will be required under Sections 2 (*d*) and 7 of this Act. Section 2 (*d*) provides that "a petition for divorce may be presented to the High Court . . . on the ground that the respondent is incurably of unsound mind, and has been continuously under care and treatment for a period of at least five years immediately preceding the presentation of the petition." As to whether a practitioner can say that any given person is "incurably of unsound mind" is of course for him to judge.

The real question affecting medical practitioners under this section of the Act is, Does the usual relationship of doctor and patient exist in such cases? It may be said that the patient does not voluntarily come to the doctor under whose care he or she will be, whether in a private or public institution. A patient is placed under the doctor's care by some person or authority who is responsible for the patient—whether it be a relation or a local authority matters little. It may be argued that the doctor is responsible not to the patient but to the person who employs him for the purpose of caring for the patient. In ordinary circumstances presumably a doctor without hesitation would give information regarding the health and prognosis of a patient to a husband or wife. Is, therefore, the extent of the information sought, or the purpose, a factor to be considered by a practitioner in giving or withholding information? It must be remembered that under the Act the interests of the patient in the event of a petition for divorce are safeguarded either by the patient's Receiver or the official solicitor, and the financial provisions of the old Act are made applicable to the new Act. Will the doctor by giving such information be committing a breach of professional secrecy? By refusing, he will be stultifying the law, particularly so far as poor persons are concerned, for

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the poor person will not be able to afford to requisition the services of a practitioner from outside the institution to examine the patient with a view to certifying, although those in more fortunate circumstances may be able to do so. Even in the latter case, the outside practitioner could hardly form an opinion without being granted access to the records of the patient. It has been suggested that those practitioners working at municipal mental hospitals may seek to cover themselves by getting their visiting committees to direct them to give such information. Even if it were desirable that practitioners should shelter from their responsibilities in this way, would it safeguard a practitioner from a charge of breach of patient's privilege?

Section 7 is easier. Under it, suits for nullity may be brought on the grounds that either party was at the time of the marriage of unsound mind or a mental defect within the meaning of the Mental Deficiency Acts 1913–1927, or subject to recurrent fits of insanity or epilepsy, or at the time of the marriage suffering from venereal disease in a communicable form, or at the time of the marriage pregnant by some person other than the petitioner. Obviously, here a practitioner must not give information obtained as a result of professional attendance except with the consent of his patient or under the direction of a judge.

It may be said that it is not the business of the medical practitioner to obstruct the law, but before they facilitate the law, practitioners are entitled to know that their own interests are not jeopardised. The questions referred to above are of considerable importance as they raise new problems on the much discussed question of professional secrecy.

I am, Sir, yours faithfully,

RICHARD W. DURAND,
Secretary, London and Counties Medical Protection Society, Ltd.

Victory House, Leicester-square, W.C., March 7th.

EPILEPSY AND ELECTRIC DISCHARGES

To the Editor of THE LANCET

SIR,—In a leading article in your issue of Jan. 29th, it was stated that in a paper just published in *Brain* [1] "Gibbs, Gibbs, and Lennox of Boston maintain that their observations on electrical discharges from the brains of epileptic patients demonstrate 'the pathological physiology of epilepsy to be a paroxysmal cerebral dysrhythmia.' This confident conclusion reflects the tone of their whole paper and brings it into contrast with that of Golla, Graham, and Walter [2] in which a more cautious attitude is expressed in the admission that 'at the present stage no definite pronouncement is possible as to the significance of the delta-wave foci in epilepsy.'" The article then states that not only is there "no apparent disagreement in the observations of the two groups," but "the technique is much the same in all laboratories," and suggests that the conclusions of the Boston workers are premature.

I am fortunate in having been in close contact with both groups of workers for whose work I have the highest possible regard, and have spent the last six months in Boston applying Walter's technique to Gibbs's material. Gibbs and his co-workers have studied the cortical potentials related to seizures, both clinical and "sub-clinical," and are investigating the biochemical factors influencing such abnormal cortical activity. For this reason it has not been their purpose to demonstrate and to localise foci of disturbance, although these have been repeatedly recognised and have been described by them.[3] Walter has shown that by recording changes in potential between different areas of cortex, foci of abnormality can be accurately localised [4] and he therefore adopted this technique. Gibbs, on the other hand, has compared the alternating potentials of cortical areas with those of an inactive area, thus obtaining a record of the absolute change in potential, and not of intercortical potential differences, as did Walter.

The resulting electrical patterns produced by the two methods are entirely different, but they each serve their purpose admirably, that of Walter to localise abnormalities, that of Gibbs to study the underlying metabolic phenomena. Gibbs has investigated mainly the seizure potentials and Walter the potentials between seizures. Again, Walter has recorded for sufficient time to establish the position of an abnormal focus of discharge accurately, while Gibbs has recorded changes in the cortical potentials from standard positions on the cranium continuously for periods up to 30 hours, using an ink-writing oscillograph. Such a method would have been unsuitable for Walter's purpose. The approach and the technique of the two groups of workers have, therefore, been different, and their observations must be correlated and not contrasted.

It is evident that Gibbs's conclusions are amply substantiated by his observations, accumulated during the last three years and published in a logical sequence of six papers.[1] Although it is true that cortical behaviour has been investigated electrically for so short a time that conclusions must be drawn with caution, these conclusions cannot be refuted by data obtained with a different technique and for a different purpose, and it is unfortunate that the conclusions of such well-known groups of investigators should have been contrasted so critically at the present stage of our knowledge of the cortical electrical disturbances associated with epilepsy.

I am, Sir, yours faithfully,

DENIS WILLIAMS.

Department of Neurology, Harvard University, Feb. 21st.

INTRAVENOUS INJECTIONS IN INSURANCE PRACTICE

To the Editor of THE LANCET

SIR,—The note in your current issue (p. 582) on "Within the Scope" reminds me of something which occurred some years ago when I practised in another county. The medical officer of health of that county sends out annually to all practitioners a letter about the treatment of venereal diseases. In this he states that practitioners may be supplied with arsenicals and other preparations provided they have held or hold certain specified appointments or have done a special course at, among other places, an army hospital. I have given in my time several hundred injections but I was not entitled to be put on the list for free supplies as I did not fulfil the exact requirements as laid down by the Ministry of Health. However, as I am in the Royal Naval Volunteer Reserve I wrote to the medical officer of health and asked if I would qualify if I were to work in the V.D. department when next I went for training to a naval hospital. I received a reply that the

[1] Gibbs, F. A., Gibbs, E. L., and Lennox, W. G., *Brain*, 1937, 60, 377.
[2] Golla, F., Graham, S., and Walter, W. G., *J. ment. Sci.* 1937, 83, 137.
[3] Gibbs, F. A., Lennox, W. G., and Gibbs, E. L., *Arch. Neurol. Psychiat., Chicago*, 1936, 36, 1225.
[4] Walter, W. G., *Proc. R. Soc. Med.* 1937, 30, 33.

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Ministry of Health recognised a course in an army hospital but not in a naval one.

It seems to me that this attitude of the Ministry, if correct, covers the case described by you. If only special practitioners are considered capable of being trusted with N.A.B., &c., a course of injections from an insurance practitioner must be against the rules, unless he has fulfilled the requirements as regards courses and appointments. If he has, then he must officially possess special skill and is therefore entitled to his special fees.

I am, Sir, yours faithfully,

Croydon-road, S.E., March 5th. E. E. D. GRAY.

STERILISING FILARIAL WORMS BY POISON

To the Editor of THE LANCET

SIR,—In an article in THE LANCET of March 5th, dealing with a man whose blinding onchocerca infection was contracted in Africa and proved in Liverpool, Dr. A. R. D. Adams makes a point, important for pathology and treatment, which will not, I think, be accepted in the future. Dr. Adams concludes that these larvæ are rapidly destroyed by certain antimony compounds, but that these have a complete lack of effect on adult worms, which put out new broods to take the place of those the drug has killed. I have collected the evidence for the action of drugs on two other filariæ [1] and for one of them, *Dirofilaria immitis* the heart worm of dogs, O. K. Khaw and Stephen Hay Chew [2] found a like disappearance of microfilariæ, in this case from the circulating blood; but analysis of their careful records shows that in every case in which the dogs were killed during the absence of microfilariæ from the blood, live female worms were indeed present in the heart, but were sterile. They had been so gravely poisoned that microfilariæ were not even being formed by them. Knowing what we do know of the way in which the active cells of the reticulo-endothelial system do their work, the reasonable explanation of the disappearance of microfilariæ from the blood of these dogs on the exhibition of the drug is surely that, as is the normal way of working of these cells, the microfilariæ then in the blood were promptly destroyed, while the effect of this poison on the ovaries of the worms was such that for a time these active reticulo-endothelial cells had no microfilariæ to deal with—I say for a time, because in all dogs who lived long enough, microfilariæ again appeared in the blood. In the same paper I suggested that the temporary disappearance of *Microfilaria bancrofti* from the blood of man for a month after injection of amino-arseno-phenol by F. Noc [3] may well have been due to the same cause, poisoning of the mother worms to the point of temporary sterilisation.

At the risk of being tedious I repeat once more that if microfilariæ are promptly destroyed by the mobile cells in question as soon as they are born, then enforced activity and multiplication of cells, whose developmental end is the fibroblast, must radically alter the views of many on the essential pathology of the diseased condition; for, as I see the microscopic changes which take place in lymph nodes which are dealing with *Mf. bancrofti*, they are just those from which the gross changes found in that infection will certainly follow; and of those changes fibrosis and its results are the most conspicuous. Fibrosis, local round the adult worm, is equally the conspicuous but not invariable tissue change in onchocerca infection. Is that too due to the host's reaction to microfilariæ born from the adult female? The capability of these microfilariæ for harm seems to be made evident by the changing corneal condition in Dr. Adams's patient as their numbers varied, so the question is raised—Does Neostibosan sterilise temporarily the female onchocerca and was that the cause of the relief which followed its administration in this man? The answer to that question seems to me to have a possibly wide importance in filariasis, for the clearer the knowledge of the mode of action of drugs, the more likely are we to be able to compare drug with drug with a view to finding out which is the best for any purpose; and in onchocerciasis with nodules the position of worms in the host's body is by that very fact disclosed. It is then possible, in persons with more than one nodule, to excise one, and after adequate treatment with any drug which has at least lessened the number of microfilariæ in skin or conjunctiva, to excise another, and to note the condition of the female worms in both instances. One proviso seems necessary. It has been felt that the fibrous coat round a nodule is so dense that microfilariæ cannot be expected to penetrate it. It might then be suggested that if they cannot get out, a drug might not get in. But so long as the worms are living they must be getting nourishment, and that they should get this amply is more necessary in order to meet the needs of a female producing numbers of microfilariæ. Since then lymph carries food into nodules, it may equally carry poison. It seems, then, reasonable to believe that in onchocerciasis we may have a means of determining how drugs act on female filarial worms and of making a comparison of drug with drug, in the hope that the information may have a value outside that particular infection; and since excision of onchocerca nodules about the head is itself a recognised part of treatment, the spacing of two such excisions, with an intermediate drug treatment, seems, in a chronic illness such as this, to be open to no objection, and to be a most promising means of increasing a knowledge of the infection which can hardly but be of value to the many infected with this and kindred parasites.

I am, Sir, yours faithfully,

Castlebar-park, W., March 7th. CLAYTON LANE.

[1] *Trans. R. Soc. trop. Med. Hyg.* 1937, 31, 61.
[2] *Chin. med. J.* 1936, Suppl. 50, 402.
[3] *Bull. Soc. Path. exot.* 1923, 16, 126.

VIKING SURGERY

To the Editor of THE LANCET

SIR,—In connexion with the comment in THE LANCET of Feb. 26th (p. 531) upon Viking surgery and the influence of the Salernitan school, there is a most graphic description of Viking surgery in the Saga of S. Olav (§234) which seems worthy of quotation. At the battle of Stiklestad (July 29th, 1030) Thormod Kolbrúnarskáld, an Icelander and one of King Olav's men, was wounded in the left side by an arrow. He broke off the shaft and made his way to a large barn which had been converted into a dressing station. It was full of wounded men, some discussing the battle and others groaning and crying out with pain. After sitting there for a little while he moved off to an outhouse where apparently the more serious cases were collected and where a woman-leech was dressing the wounds. Seeing his pallor she made him sit down and remove his clothes. She then carefully examined the wound in his side and noticed that in it could be seen a piece of iron, but she could not be certain of the track of the wound, which she had washed with warm water. In a stone kettle stood a concoction of leeks and other herbs

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boiled up together "which she gave to the wounded men to take and so tried to find out if they had deep wounds for she could notice the smell of the leek coming out of a deep wound"—a truly drastic diagnostic measure for a penetrating wound of the abdomen! Thormod, however, refused it, saying with grim humour, "It isn't porridge-sickness (*grautsótt*) that I've got." She then took a pair of forceps (*spennitong*) but the tissues were swollen and only a small piece of the iron projected from the wound so that she could not get a grip on it to pull it out. Thormod then told her to cut down on the iron and having gripped it to hand the forceps to him. This was done and he wrenched out the arrow head, which seems to have been near the heart, for as it came away it brought on the barbs "pieces of flesh and fat" and he fell back and died at once.

I am, Sir, yours faithfully,

Birmingham, March 5th. G. A. AUDEN.

REST AFTER OPERATIONS

To the Editor of THE LANCET

SIR,—Dr. Douthwaite, in your current issue, is reported to state that a patient after a clean incision in the abdominal wall is mostly quite fit to get up the next day and even to walk about. One would be glad to know if this opinion is shared by physicians, surgeons, psychologists, and last, yet by no means least, by the patients themselves. Surely the trauma both physical and psychological caused by any abdominal operation demands a longer rest to facilitate quick recovery. In these days of rush, anxiety, and uncertainty with nerve exhaustion making itself increasingly evident, such a proceeding as Dr. Douthwaite advocates would, in many cases, do infinitely more harm to a patient's nervous system than the possibility of flatulence which can be either prevented or cured. Granted that in days gone by we kept our patients in bed too long, one ventures to suggest that this is a wiser course than preventing the complete rest both of mind and body after abdominal operations which any reasonable being has a right to expect.—I am, Sir, yours faithfully,

P. SEYMOUR-PRICE.

Sloane-gardens, S.W., March 7th.

CONTRACEPTION AND FERTILITY

To the Editor of THE LANCET

SIR,—My committee ask me to state that they have decided against publishing a detailed reply to Mr. Green-Armytage's statements about contraceptives. His assumptions appear to be too much a matter of opinion to be suitable for discussion in the press. I am asked to remind your readers that our clinics are open to attendance by any medical practitioners, and that many thousands of case records are available for reference.

The National Birth Control Association maintains that the teaching of contraception should be a matter essentially for the medical profession; and whilst not doubting that indifferent and harmful methods are sometimes employed by the public, it contends that our controlled methods in no way injure health or fertility. This conclusion is shared by all members of the association, including Lord Horder (president), Dr. C. P. Blacker, Mr. Aleck Bourne, Dr. Geoffrey Bourne, Prof. F. J. Browne, Mr. Harold Chapple, Mr. C. Lane-Roberts, Sir Walter Langdon-Brown, Mr. A. C. Palmer, and Mr. L. Carnac Rivett.

I am, Sir, yours faithfully,

M. A. PYKE,
Secretary, National Birth Control Association.

69, Eccleston-square, S.W.1, Feb. 28th.

VENOUS THROMBOSIS IN CANCER OF THE STOMACH

To the Editor of THE LANCET

SIR,—In the recent correspondence in your columns on venous thrombosis as a sign of visceral cancer, Dr. Parkes Weber has raised the question of the pathological explanation of the occurrence of the venous thrombosis in such cases. Personally, I do not believe that thrombosis in malignant disease is of one uniform pathological type, but perhaps the following data may throw some light on the subject. In a series of 142 cases of carcinoma of the stomach coming to autopsy at St. Bartholomew's Hospital during the years 1919–36, there was gross venous thrombosis in six cases.

Case 23: Thrombosis of the inferior vena cava. The liver weighed 9¼ lb. and was filled with necrotic growths. In many places these filled hepatic veins.

Case 26: Thrombosis of the splenic vein, and abscess around it. General peritonitis after laparotomy.

Case 37: Liver contained secondaries spreading along the veins.

Case 43: Thrombosis of left femoral, external, internal, and common iliac veins, and vena cava to level of renal veins. The liver was filled with large secondary growths. Œdema of both legs was present.

Case 48: Thrombosis of right common iliac vein. The liver contained many secondary deposits. Œdema of right leg was present.

Case 136: Pulmonary embolus.

Case 26 can be ignored, as the thrombosis of the splenic vein was a post-operative complication, and not of spontaneous occurrence. In Case 23 the thrombotic process had apparently started in the liver where the hepatic veins were filled with growth, and it spread to the inferior vena cava. In Case 37 there was diffuse involvement of the liver by growth spreading along the veins, but no involvement of veins outside the liver. In Case 43 extensive thrombotic changes were present involving the vena cava, left common iliac veins, and the veins of the left lower limb. The liver was filled with large secondary growths, but these were not obviously within veins. The thrombosis extended to the level of the renal veins. Œdema of both limbs was present. In Case 48 there was thrombosis of the right common iliac vein with œdema of the limb. The liver contained many secondary deposits which were not obviously in veins. In Case 136 death was due to a pulmonary embolus, but there was no definite evidence as to its point of origin. There was no evidence of any peripheral œdema.

In two cases of this series, therefore, 23 and 37, there were tumour-thrombi in the veins of the liver, and in Case 23 the thrombotic process had involved the inferior vena cava. Of the two cases, 43 and 48, associated respectively with bilateral and unilateral phlegmasia alba dolens, both showed extensive deposits in the liver, and in Case 43 there was thrombosis of the deep veins of the left lower limb, the left external and common iliac, and the inferior vena cava as far as the level of the renal veins. In Case 136, where death occurred from a pulmonary embolus, there was no œdema of either lower limb.

In the thrombotic manifestations of visceral malignant disease, various factors are involved, such as pressure on veins, venous thrombosis, tumour-thrombus, and perivenous lymphatic obstruction. Certainly some of the cases of venous thrombosis are due more to the associated cachexia than to the

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malignant process. Others again, particularly those in which gross œdema of the limb is present, are secondary to perivenous lymphatic obstruction. Clinically, therefore, the process may manifest itself as a phlegmasia alba dolens or as a silent or occult pure venous thrombosis of which the first and final clinical manifestation may be a pulmonary embolus. As a physical sign of visceral malignant disease, these peripheral œdemas must usually be regarded as manifestations of an advanced stage of the malignant process, or as evidence of a profound nutritional disturbance determined by the site of the disease and its interference with function. The relative importance of œdema and swelling of one or both lower limbs as physical signs of malignant disease may be gauged from the fact that they occurred in only 8 out of 506 cases of cancer of the stomach admitted to the wards of St. Bartholomew's Hospital during the years 1921–32.

I am, Sir, yours faithfully,

REGINALD T. PAYNE.

Harley-street, W., March 7th.

OBITUARY

THE LATE PROF. MAX NEISSER

THE death on Feb. 25th of Emeritus Prof. Max Neisser in his sixty-ninth year creates another blank in that distinguished roll of German bacteriologists who have occupied Chairs of Hygiene modelled on the Koch tradition. The name of Neisser bulks largely in bacteriological literature. Albert Neisser of Breslau, the discoverer of the gonococcus, was an uncle of Max, and the veriest tiro in bacteriology is, at a very early stage, introduced to at least one achievement of the latter—the Neisser stain for *C. diphtheriæ*.

Born in 1869 at Liegnitz in Silesia, Max Neisser removed with his parents to Berlin where he received his schooling and his medical training. The work involved in the preparation of his thesis for the doctorate in medicine, which he obtained in 1893, was carried out in Rubner's laboratory. From 1894 to 1899 he was assistant to Prof. Carl Flügge in the Hygienic Institute, Breslau. In 1899 he met Paul Ehrlich—a great event in his life—and in June of that year joined the staff of the Kgl. Institut f. experimentelle Therapie at Steglitz near Berlin, later in the same year transferred to Frankfurt. He was there given charge of the Department of Bacteriology and became a professor in 1901. In 1909 he was appointed director of the new Städtisches Hygienisches Institut, later to be named the Städtisches Hygienisches Universitäts Institut when the University of Frankfurt was founded in 1914. His post then became that of Professor (Ordinarius) of Hygiene and Bacteriology.

During the war Neisser did valuable service, first in a field dressing station and later as a consultant on hygiene. In 1918 he was given the title of Geh. Medizinalrat.

When the war ended, Neisser returned to his professorial duties, resumed his scientific work, and took a prominent part in the organisation of public hygiene in the city of Frankfurt. In April, 1933, he retired, at the age of 63, and has since held the title of Professor Emeritus.

Since he embarked on his research career 45 years ago Neisser has been a most devoted and assiduous student, and his contributions, which cover a surprisingly wide range, embracing bacteriological, immunological, and hygienic studies, have been many. Before me is a list of no less than 156 titles of contributions by him in the period 1893–1935. Here I can do no more than refer briefly to some of the more outstanding achievements to his credit in the field of bacteriology and immunology.

His sojourn at Breslau under Flügge in the closing years of the nineteenth century gave him an opportunity of studying what was then a very acute and pressing problem, the differentiation of diphtheria bacilli from other diphtheroids, and the elaboration of a working technique for use in institutions concerned with the diagnosis of diphtheria.

The well-known Neisser stain for demonstration of the metachromatic bodies in diphtheria bacilli dates from this period. As one of Ehrlich's band of workers in the Frankfurt Institut, Neisser, with his colleague Wechsberg, took a prominent share in those pioneer studies conducted under Ehrlich's guidance on the nature and mode of action of hæmolysins, antitoxins, and bactericidins in immune sera during the early years of the present century. The Neisser-Wechsberg phenomenon (1901), which disclosed the fact that excess of immune body in relation to available complement interfered with bactericidal action, was an important outcome of this period of his activity. Its precise mechanism is perhaps not even now elucidated and may have to await progress in the physico-chemical attack now being made on the nature of antigen-antibody combinations.

Neisser devoted much attention to the elaboration of accurate plating technique for evaluating bactericidal action, and in connexion with the staphylococcus, on which he wrote widely, he explored with Wechsberg the possibility of detecting by aid of methylene-blue the killing power of staphylococcal leucocidin on leucocyte suspensions (so-called bioscopic method).

In 1903 Neisser's demonstration of the fact that influenza bacilli can be grown on ordinary agar in symbiosis with *B. xerosis* is of considerable historical interest in the light of later developments in our knowledge of the essential growth factors of the hæmophilic group of organisms.

In 1906 a most interesting and fruitful field in bacterial variation was opened up by Neisser's observations on an organism (*B. coli mutabile*) which, when grown on lactose agar, was capable of throwing off variants endowed with the power of fermenting lactose. The analysis of this "mutation" phenomenon, pursued by Massini and Reiner Müller and particularly by Penfold in this country, added much to our knowledge of variation phenomena in bacteria, in so far as their fermentative properties are concerned.

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During the period of his Directorship of the Hygienic Institute (1909–33) Neisser's activities, so far as one may judge from the titles of his numerous papers, were, for the most part, bound up with problems of public hygiene, over which he freely ranged, the care of the tuberculous, milk provision, bacteriological water analysis, disinfection and water purification being particularly favoured subjects. In the latter years of his directorship he devoted much attention to the possibilities of water purification by employing the bactericidal action of silver ions. To this subject he devoted the last of his three Harben lectures delivered at the Royal Institute of Public Health in 1932.

There can be no doubt that Max Neisser was an unusually gifted and versatile occupant of the first Frankfurt Chair of Hygiene, beloved of his students, and ever ready to spend himself freely in furthering every project likely to raise the standard of public hygiene in the city of his adoption.

He leaves a widow and three children. His wife was the daughter of Charles Hallgarten, one of the greatest Jewish benefactors of his native town of Frankfurt and one of the founders of its university.

(To my colleague, Miss E. Klieneberger, a former pupil of Neisser, I am indebted for certain details of his career.)

J. C. G. L.

THE LATE DR. HUXLEY FISH.—A correspondent draws attention to the fact that in an obituary notice of Dr. Fish (*Lancet*, Feb. 26th, p. 521) his appointment as physician to Harefield Sanatorium last summer was not mentioned. This appointment gave Dr. Fish the opportunity of extending the scope of his work in a direction which had long been of interest to him. Our correspondent adds, "Dr. Huxley Fish was a great man, great in heart, in intellect, in modesty, and in promise of high achievements in his profession."

PANEL AND CONTRACT PRACTICE

An Inexact Lotion

THE five standing subcommittees appointed to deal with different types of case referred to insurance committees—allocation, dispensing hours, joint services, medical service, and pharmaceutical service—are not convened regularly. Some of them may not have met at all in the twenty-five years during which medical benefit has been in operation. Meetings of the joint services subcommittee, for example, are required only when a case concerns a chemist as well as an insurance practitioner. A case recently arose in Scotland and was referred to the joint services subcommittee in which neither practitioner nor chemist was found to be at fault, but the questions which arose during the investigation showed the need for a more precise definition of a particular lotion.

The insured person's story was that, having just come out of hospital, he had contracted a "cold in his eye." He consulted his insurance practitioner, who prescribed an eye lotion which was to be diluted with four parts of water. The man carried out this instruction, applying the lotion with cotton wool and then blinking the eye in the lotion. Each application was associated with pain in the eye, but the patient thought this not unnatural and persevered. As the eye seemed to be getting worse he consulted a trained nurse, who said she did not think the lotion was for his eye, and applied other treatment which gave him relief. He then saw his doctor, who told him that the lotion supplied by the chemist was not the "Mackenzie's lotion" which he had ordered. The patient then obtained a bottle of Mackenzie's eye lotion from another chemist and this, he said, was not like the lotion supplied by the first chemist.

Evidence was given on oath (in Scotland evidence in medical and pharmaceutical service cases is so given) by the wife of the insured person and by the nurse. The practitioner, also on oath, stated that the patient had had a nerve section done in the hospital for trigeminal neuralgia. Owing to temporary paralysis of the right eyelid and consequent exposure of the eye to irritation the eye became infected after the patient's return home. The man consulted him, and he prescribed Mackenzie's eye lotion and gave appropriate directions for its use; when, later, the patient told him it hurt his eye he asked to see the lotion and found that it did not answer to the usual description of Mackenzie's eye lotion, as recognised in the district. He referred to the formula in the Pharmaceutical Formulary and said that if the chemist had any doubt as to the strength of the lotion he should have communicated with him. It emerged that the local eye infirmary had in their pharmacopœia a formula for Mackenzie's eye lotion which had been well known in the district for a number of years. The prescription was dispensed by the chemist, however, according to the formula for Mackenzie's eye wash in the Extra Pharmacopœia (Martindale) which was the only formula he knew of for Mackenzie's eye lotion. The subcommittee found no evidence that the lotion was improperly made up according to that formula and held that neither the doctor nor the chemist was in breach of his respective terms of service. They noted also that, while the patient might have suffered some temporary discomfort following the application of the lotion, there was no evidence of injury to his eye. About a fortnight after receiving the prescription for the lotion the patient was declared fit and resumed work.

The subcommittee recommended that no further action be taken in this case, but that the prescription should be referred to the panel committee in order to eliminate any doubts about the dispensing of this lotion in future. The result is satisfactory both to the doctor and to the chemist. It is possible that the patient may not be so well satisfied. Part of his case was that owing to the state of his eye he could not return to work when he expected to after his operation, and that as a result he had lost his situation. Although, as he told the subcommittee, he was employed elsewhere in a temporary capacity, he will probably blame the lotion for his ill-luck.

JOURNÉES MÉDICALES DE BRUXELLES.—This congress will be held in Brussels from April 16th to 20th, and on the last day of the meeting a visit will be paid to Ghent to see the Floralies Gantoises. The scientific programme includes papers by M. Ascoli (Palermo), A. Bessemans (Ghent), P. Bordet (Brussels), A. Castellani (Rome), and W. Falta and S. Jellinek (Vienna). Further information may be had from Dr. René Beckers, 141, rue Belliard, Brussels.

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PARLIAMENTARY INTELLIGENCE

MORE BORSTAL

ON March 1st the House of Commons went into Committee of Supply on the Civil Estimates, and Sir S. HOARE, the Home Secretary, explained that extra Borstal accommodation was necessary. There was no reason to suppose that the new generation was going to the dogs. If statistics suggested that the young were becoming more and more criminal, this was capable of a simpler and more accurate explanation. So far as Borstal cases were concerned, the main reasons for the increase were three: first, the passing of the Children Act, which had greatly stimulated public interest in the whole question of the treatment of juveniles; secondly, the fact that only about a year ago the age for boys and girls in Borstal institutions was raised from 21 to 23; and thirdly, the fact that we were now beginning to feel the results of the increase of population in the years immediately after the war. A new Borstal institution for boys was needed at once, both for the extra numbers and to provide better individual treatment. The Home Office proposed to take over what in the past was the London County Council centre for unemployed at Hollesley Bay, Suffolk, which was particularly suitable for a Borstal institution. They intended to divide the boys into four or five separate communities, run upon what in schools was called the "house" system, all of them open to the country and not enclosed by high walls. There would eventually be 300 boys at Hollesley Bay, but they would start on a smaller scale.

On a vote for Approved Schools, Sir S. HOARE said that this vote was in some respects similar to the last one, but it dealt with younger boys and girls. Here also they found that there was an increase in numbers in recent years. One of the most frequent causes of these children being sent to approved schools was the fact that they had a broken home life. There was nothing particularly criminal or malicious about these cases, but the home life of the children made it desirable that they should be placed in respectable homes for a certain period. He had sent out a circular to local authorities emphasising the importance of this matter and was glad to say that they were building remand homes more and more and developing the work in them. He was convinced that by this means the State would be saved money by preventing these children drifting into crime.

NOTES ON CURRENT TOPICS

Rent Restriction

In the House of Commons on March 2nd Sir K. WOOD, the Minister of Health, in moving the second reading of the Increase of Rent and Mortgage Interest (Restrictions) Bill, said there was a marked difference between the housing situation in England and Wales and in Scotland, but the Government believed that in all three countries it was in the national interest that decontrol should be effected as soon as there was an adequate supply of housing accommodation. The Ridley Committee, in their recent report, had pointed out that the supply of houses had much more than kept pace with the growth of population. In England and Wales in 1921 there were 4·67 persons per house, while in September, 1936, there were 3·64. As regards the proposal for the establishment of permanent tenancy courts the Government took the view that there was no necessity for an additional judicial tribunal.—Sir F. FREMANTLE said that in the interests of health and housing and of the tenant he strongly supported the Bill, and it was read a second time.

Stillbirths in Scotland

In the House of Commons on March 2nd Major NEVEN-SPENCE asked leave to introduce a Bill for the registration of stillbirths in Scotland. The Bill, he said, was not intended to deal with miscarriages, whether criminal, legal, or brought about by natural causes. He had a list of 38 principal civilised nations in which stillbirths were registered, but Scotland was not in that list. There was a case for this Bill on purely statistical grounds. In England stillbirths as well as live births were registered and entered into the computation of the maternal mortality-rate. In Scotland only live births were so registered and used, which prevented a true comparison. When this matter was considered from the point of view of maternal mortality the vital fact was not so much that a child had been born alive or dead, but that a child had been born at all. Those in charge of public health administration in Scotland had long favoured the registration of stillbirths, because it might throw some light on the causes of the unduly high infant and maternal mortality and puerperal morbidity. The efforts made in Scotland to deal with this problem had made but little headway. Scotland had an infant mortality-rate of 82 per 1000. In England the rate was 59; in Switzerland 47; in the Netherlands 39; and in New Zealand 31 per 1000. The same criticism could be levelled at the maternal mortality-rate in Scotland which was 6 per 1000, and was not showing any sign of decrease.

On March 7th the Bill was read a second time and committed to a standing committee.

On March 7th the Street Playgrounds Bill was read the third time.

On March 8th, in the House of Lords, the Blind Persons Bill and the Population (Statistics) Bill passed through Committee and the National Health Insurance (Amendment) Bill was read a second time.

QUESTION TIME

WEDNESDAY, MARCH 2ND

Mortality-rate of Nyasaland Native Miners

Mr. CREECH JONES asked the Secretary of State for the Colonies whether, in view of the report of the senior provincial commissioner of Nyasaland on Nyasaland natives working in the Union of South Africa and in Southern Rhodesia, which stated that the annual death-rate of Nyasaland workers on the South African mines was 20·28 per thousand, as against a general death-rate on the mines, for all natives, of 6·66 per thousand, he would give instructions that no further recruitment for such work should take place in Nyasaland.—Mr. ORMSBY-GORE replied: The question of the recruitment of native labour for work on the mines in the Union of South Africa was recently discussed by the governors of Southern and Northern Rhodesia and Nyasaland with a representative of the Transvaal Chamber of Mines. The mortality statistics quoted by the hon. Member, together with their explanation in paragraphs 21 and 22 of Mr. Abraham's report, were taken into consideration, and in the light of this and other factors it was decided that the recruitment of Nyasaland and Northern Rhodesia natives on a limited scale must still be regarded as experimental for a further period of one year. I am awaiting a full report from the governors concerned, but until the result of the extended experiment can be measured I am not prepared to issue instructions in the sense proposed in the question. The hon. Member is no doubt aware that the numbers recruited under the experimental arrangement are only a small proportion of those who actually find their way to work in the mines.

Penalising the Seller of Unsound Food

Mr. SORENSEN asked the Minister of Health whether in view of the undesirability of penalties being inflicted by magistrates that involved the public notification of an offence being affixed to the premises of the offender, he would take steps to end this practice.—Mr. BERNAYS, Parliamentary Secretary to the Ministry of Health, replied: I understand that the hon. Member refers to a

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recent case in which a court ordered the affixing of a notice to premises under powers contained in Section 180 (4) of the Public Health (London) Act, 1936. I would point out that the repeal of this subsection without re-enactment is proposed in the draft Food and Drugs Bill recently issued with the third interim report of the Local Government and Public Health Consolidation Committee.

THURSDAY, MARCH 3RD

Education Authorities and Physical Training

Mr. EDE asked the Parliamentary Secretary to the Board of Education what indication there was that local education authorities were extending their activities under Section 86 of the Education Act, 1921, as a result of the amendment of that section by Section 6 of the Physical Training and Recreation Act, 1937.—Mr. KENNETH LINDSAY replied: Although the amendment to Section 86 of the Education Act, 1921, has only been in operation for a comparatively short period, there is already ample evidence that local education authorities are making use of their extended powers. In the seven months since August 1st, 1937, forty-three proposals for the benefit of young persons and adults have been approved or are under consideration as compared with eighteen similar proposals in the seven months immediately prior to that date.

Occupational Birth-rates

Sir JOHN BIRCHALL asked the Minister of Health the latest figures of the birth-rate in the following cases: schoolmasters, clergymen, professional men, and skilled and unskilled wage-earners.—Sir KINGSLEY WOOD replied: The Registrar-General's report upon occupational birth-rates in 1931 is not yet complete; and certain advance figures only can be given. The following statement concerning occupational birth-rates in England and Wales in 1931 gives such information as is available:—

	Crude live birth-rate per 1000 married males under 55 years of age.
All married males (including unoccupied) under 55 years of age..	95·9
Clergymen (Anglican Church)	70·5
Teachers (not music teachers)	59·9
Professional occupations (excluding clerical staff)	73·5
Social class III, skilled workers	95·3
Social class V, unskilled workers.. ..	122·2

Accredited and Tuberculin-tested Milks

Mr. PEARSON asked the Minister of Agriculture the total amount of quality bonuses paid for accredited and tuberculin-tested milks and the estimated gallonage on which quality bonuses were paid in Glamorganshire for the years 1936 and 1937.—Mr. MORRISON replied: I regret that the information desired is not readily available, as the records of the Milk Marketing Board relating to sales of milk and payments to producers are not kept by counties, but on a regional basis. In 1936 the amount of accredited milk sold through the Board in the South Wales region, which includes Glamorgan, was 6,164,000 gallons, and the quality bonuses paid from pool funds totalled approximately £25,000. In 1937 the amount was 8,622,000 gallons and the total quality bonus paid was approximately £36,000. The quality bonus on tuberculin-tested milk was not paid prior to Oct. 1st, 1937, when sales of this milk were first brought within the Milk Marketing Scheme. In the last three months of 1937, 508,000 gallons of tuberculin-tested milk were sold through the Board in the South Wales region, the total quality bonus paid amounting to some £4000.

Vaccination Deaths

Mr. GROVES asked the Minister of Health how many death certificates were received during the year 1937 on which death was attributed entirely, or in part, to vaccination, post-vaccinal encephalitis, or vaccinia; what were the ages of the persons to whom the certificates related; and how many of them, and which, would be classified by the Registrar-General as deaths to be included in the vaccinia class.—Sir KINGSLEY WOOD replied: The answer to the first part of the question is nine. The ages of the persons concerned were respectively, 3 months, 4 months (4 cases), 5 months, 7 months, 14 years, and 24 years. As regards the last part of the question all the deaths except that of one child of 4 months have been assigned to the vaccinia class.

MONDAY, MARCH 7TH

B.M.A. and Milk Policy

Mr. GARRO-JONES asked the Minister of Agriculture whether he was aware that the expenditure of the Milk Marketing Board upon advertising the merits of milk was being largely countered by an advertising campaign sponsored by the British Medical Association, in which all milk which had not been treated by certain methods was stigmatised as dangerous to health; whether he was aware that statements in these advertisements were damaging the interests of farmers producing and selling milk which, though not treated by the methods favoured by the association, was accepted by the Ministry as of satisfactory quality; and whether he would recommend to the Milk Marketing Board an advertising policy which would neutralise the damage done to the industry by unsubstantiated statements sponsored by private interests.—Mr. MORRISON replied: I have no information as to whether the advertisements referred to have had the effect ascribed to them and I do not think that any useful purpose would be served by suggesting to the Milk Marketing Board that they should change their present advertising policy, which is designed to encourage the consumption of milk generally.

Mr. GARRO-JONES said that as the Minister did not appear to appreciate all the repercussions of this advertising campaign, he would raise the matter on the motion for the adjournment of the House at the earliest opportunity.*

Government's Milk Policy

Mr. SANDYS asked the Minister of Agriculture when he proposed to introduce a Bill to give effect to the proposals for the development of the Government's milk policy, as announced in Command Paper 5533 issued in July, 1937.—Mr. MORRISON replied: Legislation to give effect to the proposals contained in the Government's white paper on milk policy will, I hope, be introduced shortly after the Easter recess.

Admission of Foreign Professional Men

Mr. ROSTRON DUCKWORTH asked the Home Secretary how many foreign professional men had been allowed in the last two years to settle and practise in this country; and whether he could give the numbers in each profession.—Mr. GEOFFREY LLOYD, Under-Secretary, Home Office, replied: Foreigners who are admitted to this country are usually admitted for the purpose of visits of varying duration. These periods may be extended on due cause being shown, but the granting of such extensions does not necessarily mean that the foreigner will be allowed to settle down here. For example, a number of foreigners are allowed to remain here for a year or two for business or study, but it is not contemplated that they will settle permanently in the country. All that can be said is that during the year 1937 extensions of stay were granted in

* In the *Times* of March 7th appeared the following letter signed by the chairman, vice-chairman, hon. secretary, and five members of the Non-Party Medical Committee of the House of Commons.

"Sir,—The Conservative Agricultural Committee and the Minister of Agriculture have taken exception to the 'Safe Milk' advertisements issued by the British Medical Association. The Non-Party Medical Committee hold no brief from the B.M.A., but are of opinion that the B.M.A. are bound to defend the rights of the public to know the dangers to which their health is exposed and to know the way to avoid them. Much disease is caused by unsafe milk and would be prevented if the milk were made safe. All liquid milk for human consumption should be adequately pasteurized or boiled.

"The Agricultural Committee cannot dispute 'the facts about unsafe milk' nor the conclusion that 'milk must be made safe.' While they appear to dispute these essential health factors they are stifling their best commercial agents—namely, the medical profession, who are anxious to promote the consumption of more safe milk. Surely the lesson of the Croydon typhoid epidemic applies to milk as to water.

"The sooner the agriculturists can agree with the doctors on a joint policy the better will it be both for health and agriculture."

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813 cases of professional men and women who had arrived during the last three or four years. Their occupations can be classified as follows: architects, 19; artists, 25; dentists, 66; doctors, 181; lawyers, 12; writers, 35; others, 475 (including nearly 300 research workers).

TUESDAY, MARCH 8TH

Condemned School Buildings

Mr. WILLIAM JOSEPH STEWART asked the Parliamentary Secretary to the Board of Education the number of elementary schools in England and Wales that were condemned by the Board's survey to be replaced; the number that had been replaced by new buildings; and the number that still remained to be dealt with.—Mr. KENNETH LINDSAY replied: A total of 679 schools were originally placed in Class A of the "Black List," that is, schools reported as unsuitable for continued recognition and incapable of improvement. Of these, 518 have already been dealt with by closure, replacement or reconstruction, and of the 145 still on the list, plans for the replacement or reconstruction of 29 have been approved by the Board. The future of these schools is intimately bound up with reorganisation, which is the main occupation of the Board and the local education authorities at the present time.

MEDICAL NEWS

Society of Apothecaries of London

At recent examinations the following candidates were successful:—

Surgery.—P. H. Beamish, St. George's Hosp.; G. H. L. Bullmore, Univ. Coll. Hosp.; P. C. Conran, Univ. Camb. and Middlesex Hosp.; A. W. Frankland, Univ. Oxf. and St. Mary's Hosp.; and S. J. Nathan and J. R. Rose, Charing Cross Hosp.

Medicine.—F. E. Buckler, London Hosp.; E. E. Bullock, Univ. Leeds; G. G. O. Evans, Charing Cross Hosp.; J. B. Good, Guy's Hosp.; M. W. Hemans, Univ. Oxf. and St. George's Hosp.; I. M. Monare, Royal Colleges, Edin.; B. Oppenheim, Univ. Manch.; E. S. Reed, Univ. Camb. and St. Mary's Hosp.; A. T. Rogers, St. Mary's Hosp.; and G. L. Young, St. Bart.'s Hosp.

Forensic Medicine.—A. Backman, Guy's Hosp.; F. E. Buckler, London Hosp.; E. E. Bullock, Univ. Leeds; J. B. Good, Guy's Hosp.; M. W. Hemans, Univ. Oxf. and St. George's Hosp.; B. Oppenheim, Univ. Manch.; E. S. Reed, Univ. Camb. and St. Mary's Hosp.; A. T. Rogers, St. Mary's Hosp.; and G. L. Young, St. Bart.'s Hosp.

Midwifery.—P. H. Beamish, St. George's Hosp.; G. E. N. Bird, St. Bart.'s Hosp.; F. P. S. Malone-Barrett, Westminster Hosp.; B. Oppenheim, Univ. Manch.; A. Smith, St. Mary's Hosp.; and B. W. S. Spurgin, Univ. Manch.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery: P. H. Beamish, E. E. Bullock, G. G. O. Evans, A. W. Frankland, J. B. Good, S. J. Nathan, E. S. Reed, A. T. Rogers, and G. L. Young.

Leeds University

Dr. W. E. Adams has been appointed lecturer in histology in the University.

British Institute of Philosophy

An address entitled The Philosophy of Mysticism will be given by The Very Rev. W. R. Inge on Monday, March 21st, at 8.15 P.M., at University College, Gower-street, London, W.C. Tickets may be had from the director of studies at University Hall, 14, Gordon-square, London, W.C.1.

Chadwick Lecture

On Thursday, March 24th, at 5.30 P.M., at the London School of Hygiene, Keppel-street, W.C., Mr. W. J. E Binnie will speak on water-supply in relation to public health. Admission to the lecture is free, and further information may be had from the secretary at the offices of the Chadwick Trust, 204, Abbey House, London, S.W.1.

Lectures in Hospital Administration

A three months' course of lectures and demonstrations on clinical practice and hospital administration will be given by Dr. J. V. Armstrong at the Brook Hospital, Shooters Hill, Woolwich, S.E., on Mondays, Wednesdays, and alternate Saturdays, beginning on April 4th. Further particulars may be had from the medical officer of health of the London County Council, Public Health Department (Special Hospitals), County Hall, S.E.1.

Deutsche Gesellschaft für Innere Medizin

This society will meet at Wiesbaden from March 28th to 31st under the presidency of Prof. Assmann (Königsberg). The principal subjects for discussion will be tests of heart function, function and diseases of the adrenals, vitamin B, and acute inflammatory disease of the central nervous system. Further information may be had from the Verkehrsbüro, Wilhelmstr. 24, Wiesbaden.

University of Cape Town

On March 8th Dr. A. W. Falconer, professor of medicine in the university, was installed as principal and vice-chancellor in succession to Sir Carruthers Beattie, who has retired.

American Laryngological, Rhinological and Otological Society

This society will hold its annual meeting in Atlantic City on April 27th, 28th, and 29th under the presidency of Dr. Samuel J. Kopetzky. Mr. V. E. Negus (London) and Prof. Henri Coutard (Paris) will speak at the meeting. Further information may be had from the secretary, Dr. C. Stewart Nash, 708, Medical Arts Building, Rochester, N.Y.

International Medical Post-Graduate Academy in Budapest

At the thirteenth International Medical Congress in Budapest, in 1909, the International Medical Post-graduate Committee was formed, and it held its second session at the International Medical Congress held in London in 1913. At the International Medical Post-graduate Congress held in Berlin last August, at which 44 nations were represented, it was decided that an International Medical Post-Graduate Academy should be established at Budapest, and the Hungarian Medical Post-graduate Committee has been asked to arrange a meeting there on April 24th when a course of lectures on research and post-graduate training will be given. Further information may be had from Prof. Emile de Grósz, Üllöi-ut 26, Budapest, VIII.

Society of Public Analysts

Dr. G. Roche Lynch, retiring president, took the chair at the sixty-fourth anniversary dinner of the Society of Public Analysts and other Analytical Chemists, when Mr. Norman Birkett, K.C., proposed the toast of The Society, whose work, he said, was always devoted to the public advantage and the public weal. Dr. Lynch, in reply, asked those present to drink the health of Mr. Bernard Dyer, D.Sc., the only surviving foundation member present. During its long existence, he said, the society had done much to raise the status of public analysts and by its regular meetings and by its organ *The Analyst* had contributed much to an essential branch of chemistry. The association of public analysts with the law was recognised by the presence there of Mr. Justice Singleton, the public prosecutor, and the chief commissioner of police, while the cordial relation between pure and applied chemistry was evident from the presence of the presidents of the Chemical Society, the Institute of Chemistry, and the Institution of Chemical Engineers. In proposing the toast of H.M. Judges, Mr. E. Richards Bolton, a past-president, spoke of the confidence in their consideration and patience felt by any expert witness who was ready to help the court. Mr. Justice Singleton had kind things to say about the conduct of the bar and the efficiency of jurors, but Mr. Birkett was less impressed. Jurors, he said, varied. He complained, too, that the chairman often made the work of defending counsel difficult, for he found blood stains where no other human being or even bloodhound could find them; yet the defence would always rely on his fairness. Mr. A. L. Bacharach toasted The Guests, and Lord Cornwallis, Sir Philip Game, and Sir Robert Pickard replied.

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Course on the Bug Nuisance

The Royal Sanitary Institute will hold a further fortnight's course of instruction in disinfestation of houses and furniture from the bed-bug, beginning on Monday, May 16th. Full particulars can be had from the secretary of the institute, 90, Buckingham Palace-road, London, S.W.1.

Prof. Jung's Lectures Postponed

On account of illness Prof. C. G. Jung of Zürich has had to postpone the lectures for medical practitioners which he had arranged to give at the Tavistock Clinic from April 4th to 8th. If his health permits he hopes to give them during the week Oct. 3rd to 7th.

Royal Society of Arts

On Wednesday, March 23rd, Lord Horder will deliver the Trueman Wood memorial lecture to this society at 8.30 P.M. He will speak on Public Health: the Hygiene of a Quiet Mind. The following Wednesday at 8.15 P.M., Sir Aldo Castellani will read a paper on the hygienic measures and hospital organisation of the Italian Expeditionary Forces during the Ethiopian war, 1935–36. Both lectures will be given at the house of the society, John-street, Adelphi, London, W.C.

British Postgraduate Medical School

On April 6th, 13th, 20th, and 27th, at 4.30 P.M., Dr. C. H. Andrewes will lecture on recent work on viruses in the department of pathology of the school. In the department of medicine Sir Edmund Spriggs will give six lectures, beginning on Monday, March 28th, at 2.30 P.M. He will speak on diseases of small and large intestine. A limited number of tickets are available and may be had on application to the dean of the school, Ducane-road, London, W.12.

Incorporated Society of Chiropodists

The annual convention of this society, which is this year celebrating its silver jubilee, will be held in London on March 18th and 19th. Prof. J. H. Burn will deliver a lecture on the disinfection of the skin and of superficial wounds, and films will be shown by Mr. H. A. T. Fairbank (open operation on congenital dislocation of the hip), Sir Harold Gillies (hinged graft for depressed nasal bridge), Mr. R. Watson Jones (treatment of fractures of both bones of the leg), and Dr. Erwin Straus (electrodiagnostics on the healthy body). The society may be addressed at 21, Cavendish-square, London, W.1.

Premarital Advice in Australia

At a pre-marriage clinic, now open in Sydney, health tests are available for couples about to marry. With a subsidy from the New South Wales government, the Racial Hygiene Association has sponsored the clinic, which arranges an overhaul for a nominal fee, with advice, where required, from twelve specialists. It issues certificates that the two parties are fit to marry and raise a family; or that the marriage should be delayed, or should be permitted without parentage, or should definitely be discouraged. The clinic is already receiving about 100 letters each month from people wanting help on marriage problems.

Francis Amory Septennial Prize

Under the will of the late Francis Amory of Beverly, Massachusetts, the American Academy of Arts and Sciences administer a fund to provide a septennial prize for outstanding contributions to knowledge "through experiment, study or otherwise . . . in the diseases of the human sexual generative organs in general" during the seven years preceding any award. If there is work of a quality to warrant it, the first award will be made in 1940. The total amount of the prize will exceed 10,000 dollars, and it may be given in one or more awards. While there will be no formal nominations, and no formal essays or treatises will be required, the committee invites suggestions, which should be made to the Amory Fund Committee, care of the American Academy of Arts and Sciences, 28, Newbury-street, Boston, Massachusetts, U.S.A.

Medical Diary

March 14th to March 20th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY.

United Services. 4.30 P.M., Group Captain A. F. Rook: Infection of the Urinary Tract in the Male.

TUESDAY.

General Meeting of Fellows. 5.30 P.M.

Pathology. 8.15 for 8.30 P.M., annual general meeting. D. G. ff. Edward: Agent Responsible for the Gordon Test in Lymphadenoma. A. Felix: Serum Diagnosis of Chronic Typhoid Carriers. R. Cruickshank: Puerperal and Post-abortal Infections Associated with Anaerobic Bacteria. J. R. Gilmour: Bone and Adrenal Changes in Erythroblastosis Fœtalis.

THURSDAY.

Dermatology. 5 P.M. (Cases at 4 P.M.) Dr. H. MacCormac: (1) Generalised Scleroderma.

Neurology. 8.30 P.M. Dr. S. De Navasquez and Dr. H. Treble: Primary Generalised Amyloid Disease with Involvement of the Nerves.

FRIDAY.

Physical Medicine. 4.30 P.M. Lord Dawson: Physical Education. Prof. B. A. McSwiney and Major W. Campbell will also speak.

Obstetrics and Gynæcology. 8 P.M. Mr. J. Bright Banister and Mr. A. H. McIndoe: Congenital Absence of the Vagina Treated by Means of the Indwelling Skin Graft. Mr. Neon Reynolds: Post-maturity. Mr. R. H. Paramore: Lower Uterine Segment Cæsarean Section. (Film.)

Radiology. 8.30 P.M. Prof. Henry Cohen, Dr. Duncan White, and Dr. M. H. Jupe: Skeletal Changes in Metabolic and Endocrine Disorders.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.

THURSDAY.—8.15 P.M., laboratory meeting at the Royal Army Medical College, Grosvenor-road, Millbank, S.W.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.

MONDAY.—8.30 P.M., Dr. Izod Bennett, Mr. A. Dickson Wright, and Dr. W. G. Oakley: Uræmia.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Thornhaugh-street, W.C.

FRIDAY.—5 P.M., Dr. Arthur Massey, Dr. James Ferguson: Hospital Policy in Relation to Preventive Medicine. 8.30 P.M. (*Maternity and Child Welfare Group*), Dr. J. E. Wilson: How to Breathe.

CHELSEA CLINICAL SOCIETY.

TUESDAY.—8.30 P.M. (Hotel Rembrandt, Thurloe-place, S.W.), Dr. A. F. H. Coke: Sedimentation Tests in Rheumatism.

NORTH LONDON MEDICAL AND CHIRURGICAL SOCIETY.

THURSDAY.—9.15 P.M. (Royal Northern Hospital, N.), Dr. J. Kerr Russell: Treatment by Hyperpyrexia.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck-street, W.

THURSDAY.—8.30 P.M., Dr. Van de Maele: The Direct Radiokinematography.

FRIDAY.—11 A.M., visit of medical members to the in-patient department of the Western Hospital for Nervous Disease Gloucester-gate, N.W. 5.30 P.M., case demonstration and discussion.

SOCIETY OF RADIOTHERAPISTS OF GREAT BRITAIN AND IRELAND.

FRIDAY.—5 P.M. (11, Chandos-street, W.), Dr. G. F. Stebbing, Dr. J. R. K. Paterson, Mr. B. W. Windeyer, and Mr. L. H. Clarke: Methods of Measuring and of Recording Dosage.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.

TUESDAY and THURSDAY.—5 P.M., Dr. George Riddoch: Pain of Central Origin. (Lumleian lectures.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.

MONDAY.—5 P.M., Dr. L. W. Proger: demonstration of new museum specimens.

FRIDAY.—5 P.M., Dr. A. J. E. Cave: Anatomy of the Skin.

UNIVERSITY OT LONDON.

TUESDAY.—5 P.M. (University College, Gower-street, W.C.), Prof. A. P. H. De Kleijn: Some Remarks on Vestibular Physiology.

UNIVERSITY OF GLASGOW.

TUESDAY.—4.30 P.M. (Tennent Memorial Building, Church-street), Prof. A. J. Ballantyne: Diseases of the Iris, Ciliary Body and Choroid.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland-place, W.

WEDNESDAY.—3.30 P.M., Dr. W. S. C. Copeman: Rheumatism and the National Health.

INSTITUTE OF CHILD PSYCHOLOGY.

MONDAY.—6.15 P.M. (Friends House, Euston-road, N.W.), Dr. Elspeth Macleod: The Satisfactory Adolescent. 8.15 P.M., Dr. Ethel Dukes: Success in Family Life.

ST. GEORGE'S HOSPITAL, S.W.

THURSDAY.—5 P.M., Dr. Antony Feiling: neurological demonstration.

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BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Dr. T. H. Belt: Pulmonary Embolism. 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Prof. C. R. Harington, F.R.S.: The Thyroid and its Secretions.
THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration. 3.30 P.M., Mr. V. B. Green-Armytage: Sterility. 4.30 P.M., Mr. Kenneth Walker: Venereal Diseases.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. Geoffrey Keynes: Diseases of the Breast.
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY.—2 P.M., Mr. James Crooks: Some Problems of Hearing in Infants and Young Children. 3 P.M., Dr. W. G. Wyllie: Infantile Convulsions.
Out-patient clinics daily at 10 A.M., and ward visits at 2 P.M.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY.—3.30 P.M., Dr. C. P. Symonds: Cerebral Tumours (3).
TUESDAY.—3.30 P.M., Dr. F. M. R. Walshe: Diseases of Extrapyramidal Motor System.
WEDNESDAY.—3.30 P.M., Dr. Walshe: clinical demonstration.
THURSDAY.—3.30 P.M., Dr. Denis Brinton: Vascular Disease of the Nervous System.
FRIDAY.—3.30 P.M., Dr. E. A. Carmichael: Friedreich's Ataxia.
Out-patient clinic daily at 2 P.M.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
MONDAY to SATURDAY.—General practitioners' week.
FRIDAY.—4 P.M., Mr. A. Lowndes Yates: Familial Throat and Nose Affections.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL, N.W.
WEDNESDAY.—4 P.M., Dr. H. Courtney Gage: Radiology in Obstetrics and Gynæcology.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W.
TUESDAY.—5.30 P.M., Dr. John Parkinson: Myocardial Disease.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY to SUNDAY.—ROYAL CHEST HOSPITAL, City-road, E.C., Mon., Wed., and Fri., 8 P.M., course in diseases of the heart and lungs.—ALL SAINTS' HOSPITAL, Austral-street, S.E., Sat. and Sun. course in urology.—F.R.C.S. (PRIMARY) PHYSIOLOGY COURSE, Mon., Wed., and Fri., 5.30 P.M.—BROMPTON HOSPITAL, S.W., twice weekly, 5.15 P.M., M.R.C.P. course in chest diseases.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.
FRIDAY.—4.30 P.M., Mr. A. G. Timbrell Fisher: Physical Medicine and Orthopædic Surgery (2).

MANCHESTER ROYAL INFIRMARY.
FRIDAY.—4.15 P.M., Dr. Norman Kletz: clinical demonstration.

LEEDS GENERAL INFIRMARY.
TUESDAY.—3.30 P.M. (Maternity Hospital), Mr. A. M. Claye: Some Clinical Points in Antenatal Supervision.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY.—4.15 P.M. (Eye Infirmary), Dr. S. Spence Meighan: Injuries of the Eye.

Appointments

ATKINSON, E. C., M.B. Lond., Resident Aural Registrar at the Hospital for Sick Children, Great Ormond-street.
DE, HIREN, M.R.C.S. Eng., Casualty Officer and Fracture House Surgeon at the Chesterfield and North Derbyshire Royal Hospital.
DURAND, R. W., M.R.C.S. Eng., Secretary to the London and Counties Medical Protection Society.
FEGGETER, G. Y., M.S. Durh., F.R.C.S. Eng., Hon. Assistant Surgeon to the Royal Victoria Infirmary, Newcastle-upon-Tyne.
MCCRACKEN, D. A., M.B. Glasg., D.P.H., Assistant Medical Officer of Health and Assistant School Medical Officer for Cannock.
TURNER, A. F., M.B. Belf., D.P.H., Assistant School Medical Officer for Huddersfield.
TWOMEY, T. P., M.B. Liverp., D.M.R.E., D.P.H., Resident Medical Officer at Bradley Wood Sanatorium, Huddersfield.
WATERSON, DOROTHY, M.B. Edin., D.P.H., Female Venereal Diseases Officer at Leicester Royal Infirmary.
WINTELER, J. C., M.D., M.R.C.P. Lond., Assistant Physician to the Belgrave Hospital for Children.

London County Council Hospital Staff.—The following appointments, promotions, and transfers are announced. A.M.O. (I) or (II) = Assistant Medical Officer, Grade I or II:—
VAN LANGENBERG, E. R., M.R.C.P. Lond., A.M.O. (I), St. Nicholas';
GALLEN, BEDELIA, M.B. Glasg., A.M.O. (II), Bethnal Green;
BEADNELL, LOUIE M. M., M.R.C.S. Eng., A.M.O. (II), Bethnal Green;
DAVIDSON, W. G., M.B. St. And., A.M.O. (II), Dulwich;
RODGER, D. E., M.D. McGill, L.M.S. N.Scotia, P.M.Bd., A.M.O. (II), Fulham;
POND, E. D., M.R.C.S. Eng., A.M.O. (II), New End;
ABRAMOVICH, HYMAN, M.B. Sydney, A.M.O. (II), St. Nicholas';
SHAPIRO, ALEXANDER, M.B. Lond., A.M.O. (II), St. Leonard's;
STERN, HEDWIG H., M.D. Berlin, L.R.C.P. Edin., A.M.O. (II), St. Leonard's;
QUIN, B. O., M.B. N.Z., M.R.C.P. Lond., A.M.O. (II), North-Eastern;
TOMBLESON, J. B.L., M.D. Lond., A.M.O. (II), South-Eastern;
FORREST, SCOTT L., M.B. Edin., D.P.H., A.M.O. (II), Western;
BRADY, TERENCE, M.B. N.U.I., House Physician, Downs;
MARTIN, ELIZABETH, M.B. Aberd., House Physician, High Wood;
LAMB, H. D., L.M.S.S.A. Lond., House Physician, Lewisham;
DOEY, W. D., B.A. Camb., M.R.C.S. Eng., House Surgeon, Mile End;
POLLEY, S. F., M.R.C.S. Eng., House Physician, St. Giles';
MARTIN, MARY M., M.B. Aberd., House Physician, St. Luke's, Chelsea;
STRAUSS, J. N., M.B. Manch., M.R.C.P. Lond., D.T.M. & H., Clinical Assistant (part-time), Whitechapel Clinic;
ROBB, T. M., M.R.C.S. Eng., Senior A.M.O. (II), Lambeth;
ARMSTRONG, J. R., M.B. Belf., Senior A.M.O. (II), St. Peter's;
LAIRD, ROBERT, M.B. Glasg., F.R.C.S. Edin., Senior A.M.O. (II), St. Mary Abbots;
LAWSON, R. S., M.S. Melb., A.M.O. (I), St. Alfege's;
BOUCHER, C. A., B.M. Oxon., A.M.O. (I), Paddington;
PALMER, E. A. E., M.B. Camb., D.A., A.M.O. (I), Lewisham;
BIRRELL, N. V., M.B. Glasg., D.P.H., A.M.O. (I), St. Stephen's;
SMELLIE, ELSPETH W., B.M. Oxon., A.M.O. (II), White Oak;
NEVIN, MARY E., M.B. Belf., A.M.O. (II), North-Eastern; and
DROSSO, VICTOR, M.R.C.S. Eng., House Physician, Mile End.

County Council of Middlesex.—The following appointments are announced:—
GRAIG, D. B., F.R.C.S. Edin., D.L.O., Surgeon (Grade I) at the Redhill County Hospital;
STERN, D. M., M.B. Camb., F.R.C.S. Eng., M.C.O.G., Obstetrician (Grade I) at the West Middlesex County Hospital;
SHEPHERD, H. M. D., M.D., M.R.C.P. Edin., Resident Assistant Medical Officer at the Redhill County Hospital;
EVANS, W. E. F., L.R.C.P. Lond., Resident Assistant Medical Officer at the West Middlesex County Hospital;
MORTON, H. J. V., M.B. Camb., D.A., Resident Assistant Medical Officer at the Hillingdon County Hospital; and
DUNCAN, G. W., M.B. Lond., Resident Assistant Medical Officer at the Hillingdon County Hospital.

London Hospital.—The following appointments are announced:
BUCKLEY, P. S., B.M. Oxon., M.R.C.P. Lond., First Assistant to the Neurological Department;
LAW, W. A., M.B. Camb., F.R.C.S. Eng., Surgical First Assistant and Registrar; and
THOMPSON, V. C., M.B. Lond., F.R.C.S. Eng., First Assistant to the Department of Thoracic Surgery.

St. Albans and Mid Herts Hospital.—The following appointments are announced:—
LINNELL, J. W., M.D. Camb., M.R.C.P. Lond., Hon. Consulting Physician;
WILLIAMS, B. W., M.B. Oxon., F.R.C.S. Eng., Hon. Consulting Surgeon;
MEADOWS, S. P., M.D., M.R.C.P. Lond., Hon. Consulting Neurologist; and
BURROWS, H. JACKSON, M.D. Camb., F.R.C.S. Eng., Hon. Consulting Orthopædic Surgeon.

Colonial Service.—The following appointments and promotions are announced:—
GRIFFIN, W. P., M.B. Dubl., Medical Officer, Cyprus;
MCGLADDERY, H. M., M.B. Lond., F.R.C.S. Eng., Medical Officer, Malaya;
CHRISTIANSON, E., M.B. Edin., Medical Officer, Seychelles;
BAXTER, G. R., M.D. Leeds, D.T.M. & H., D.P.H., Medical Officer of Health and Port Health Officer, Fiji;
MORLEY, A. H., M.B. Lond., D.T.M. & H., D.P.H., Medical Officer, Tanganyika;
PASQUAL, J. R. H., M.B. Edin., Senior Medical Officer, Nigeria;
VAUGHAN, G. W., M.B. Glasg., Senior Medical Officer, Nigeria; and
BLOK, E. A., L.M. & S. Ceylon, L.R.C.P. Edin., Senior Medical Officer, Department of Medical and Sanitary Services, Ceylon.

Vacancies

For further information refer to the advertisement columns

Aberdeen Royal Hosp. for Sick Children.—Hon. Asst. Physician.
Accrington Borough.—Deputy M.O.H. and School M.O., £500.
Acton Hosp., W.—Cas. O., at rate of £150.
Barbados General Hosp.—Med. Supt., £700.
Bedford County Hosp.—H.S., at rate of £155.
Birmingham Ear and Throat Hosp.—Third H.S., at rate of £150.
Birmingham and Midland Eye Hosp.—H.S., at rate of £130
Birmingham, St. Chad's Hosp.—H.S., at rate of £150.
Birmingham, Selly Oak Hosp.—Res. Physician, £650.
Blackburn County Borough.—Asst. M.O.H. and Asst. School M.O., £600.
Bolton Royal Infirmary.—Asst. Res. Surg. O., £200.
Bradford, Grassington Sanatorium.—Asst. M.O., £175.
Brighton, Royal Sussex County Hosp.—Cas. H.S., £120.
British Postgraduate Medical School, Ducane-road, W.—First Asst. in Dept. of Surgery, £250–£500.

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Burnley, Victoria Hosp.—H.P., at rate of £150.
Burton-on-Trent General Infirmary.—Sen. H.S., £200.
Buxton, Devonshire Royal Hosp.—Res. M.O. and H.P., at rate of £200 and £150 respectively.
Cambridge, Addenbrooke's Hosp.—H.P., H.S. to Spec. Dept., and Res. Anæsthetist and Emergency Officer, each at rate of £130.
Canterbury, Kent and Canterbury Hosp.—H.S., at rate of £125.
Canterbury, Venereal Diseases Clinic.—Part-time M.O., 3 guineas a session.
Cardiff, King Edward VII Welsh National Memorial Association. Asst. Res. M.O., £200.
Central London Throat, Nose, and Ear Hosp., Gray's Inn-road, W.C.—Reg. and Clin. Tutor, £300.
Cherisey, Surrey, Bolleys Park Colony.—Deputy Med. Supt., £720.
Chester Royal Infirmary.—H.S. to Ear, Nose, and Throat and Gynæcological Depts., at rate of £150.
City of London Maternity Hosp., City-road, E.C.—Asst. Res. M.O., at rate of £100.
Colonial Medical Service.—Asst. Pathologist in Malayan Med. Service, £700.
Doncaster Royal Infirmary.—Fracture H.S., £200.
Dorset County Council.—County Pathologist, £750.
Durham County Council.—Temp. Asst. M.O.H., £600. Also Asst. Welfare M.O., £500.
Ealing Borough.—Asst. M.O., £450.
Essex Administrative County.—Asst. Specialist Ophth. Surgeon, £700.
Essex County Council.—Part-time Ophth. Surgeon, at rate of £200.
Evelina Hosp. for Sick Children, Southwark, S.E.—H.S., at rate of £120.
Forest Gate Hosp., Forest-lane, E.—Asst. Res. M.O., £350.
Gloucestershire County Council.—Two Asst. County M.O.H.'s, each £500.
Gt. Barrow, Barrowmore Tuberculosis Sanatorium and Settlement. H.P., at rate of £150.
Grimsby Corporation Hosp. and Sanatorium.—Res. M.O., £350.
Halifax Royal Infirmary.—Res. Surg. O., £250. Also H.S.'s, at rate of £200, £175, and £150 respectively.
Hampstead General and North-West London Hosp., Haverstock Hill, N.W.—Res. Cas. M.O., at rate of £100.
Harefield, County Sanatorium.—Physician, £1000.
Haywards Heath, Brighton County Borough Mental Hosp.—Third Asst. M.O., £350.
Hertford County Hosp.—H.P., at rate of £150.
Hosp. for Epilepsy and Paralysis, Maida Vale, W.—Res. M.O. and H.P., at rate of £150 and £100 respectively.
Hosp. for Sick Children, Great Ormond-street, W.C.—Res. Med. Supt. and Out-patient Aural Registrar, £200 and £175 respectively. Also two H.P.'s and two H.S.'s, each at rate of £50.
Hosp. of St. John and St. Elizabeth, 60, Grove End-road, N.W.—Res. H. S., at rate of £75. Also Asst. Phys.
Indian Medical Service.—Commissions.
Isleworth, West Middlesex County Hosp.—Anæsthetist and Asst. M.O., each £400.
Leeds Public Dispensary and Hosp.—H.P., at rate of £150.
Leicester City Mental Hosp.—Asst. M.O., £350.
Lincoln City Hosp. and Sanatorium.—Res. M.O., £300.
Lincoln, The Lawn.—Asst. M.O., £300.
Liphook, King George's Sanatorium for Sailors.—Asst. M.O., at rate of £200.
Liverpool, Alder Hey Children's Hosp.—Res. Asst. M.O., at rate of £200.
London County Council.—Radiologists, each £900; Obstetrician and Gynæcologist, £800. Also Anæsthetists, each £125.
London Hosp., E.—Anæsthetist to Dept. of Neurosurgery, £250.
London Jewish Hosp., Stepney Green, E.—Ear and Throat Registrar, 20 guineas.
Manchester Royal Eye Hosp.—H.S., £120.
Manchester, St. Mary's Hosps.—H.S.'s to Spec. Depts., each at rate of £50.
Manchester and Salford Hosp. for Skin Diseases.—H.S., at rate of £150.
Margate, Royal Sea Bathing Hosp.—Asst. Med. Supt., £500.
Medical Research Council, 38, Old Queen-street, S.W.—Kathleen Schlesinger Research Fellowship, £300.
Middlesex County Council.—Sen. Obstet. Surgeon for Redhill County Hosp., £850. Also Obstet. Surgeon for North Middlesex County Hosp., £500.
Mount Vernon Hosp., Northwood.—H.S., £150.
Newcastle-upon-Tyne, King's College.—Asst. Bacteriologist, £350.
Newcastle-upon-Tyne Royal Victoria Infirmary.—Jun. Gynæcologist and Obstet. Registrar, £300.
North Middlesex County Hosp., Edmonton.—Jun. Res. Asst. M.O., at rate of £250.
Norwich City.—Asst. M.O.H. and Asst. School M.O., £600.
Oxford, Wingfield-Morris Orthopædic Hosp., Headington.—H.S., at rate of £100.
Plymouth, Prince of Wales's Hosp., Greenbank-road.—Asst. Pathologist, £500. Also Jun. H.S., at rate of £120.
Preston and County of Lancaster Royal Infirmary.—Two H.S.'s to Spec. Depts., each at rate of £150.
Preston, Sharoe Green Hosp.—Jun. Asst. Res. M.O., at rate of £100.
Princess Louise Kensington Hosp. for Children, St. Quintin-avenue, W.—H.S., at rate of £120.
Queen Charlotte's Maternity Hosp., Marylebone-road, N.W.—Res. Anæsthetist, at rate of £100.
Queen Mary's Hosp. for the East End, E.—Clin. Asst. to Skin Dept.
Queen's Hosp. for Children, Hackney-road, E.—Asst. Physician.
Rotherham Hosp.—H.P., £180.
St. George's Hosp., S.W.—Physician. Also Asst. Physician.
St. John Clinic and Institute of Physical Medicine, Ranelagh-road, S.W.—Hon. Clin. Asst. in Orthopædic Dept.
St. John's Hosp., Lewisham, S.E.—Hon. Physician to Children's Dept.
St. Mary's Hosp., W.—Med. Reg., £200.
Sheffield Children's Hosp.—H.S., at rate of £100.
Southampton, Free Eye Hosp.—H.S., £150.
Southampton, Royal South Hants and Southampton Hosp.—H.S., at rate of £150.
South-Eastern Hosp. for Children, Sydenham, S.E.—Res. M.O., at rate of £100.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—Res. Anæsthetist, at rate of £150.
Stoke-on-Trent, Stanfield Sanatorium.—Res. M.O., £350.
Surrey County Council.—Asst. M.O., £600.
Swanley, Kent, Alexandra Hosp. for Children with Hip Disease.—Second Res. M.O., at rate of £250–£300.
Taunton and Somerset Hosp.—H.S., £125.
Tunbridge Wells, Kent and Sussex Hosp.—Res. Surg. O., £250.
Walsall Manor Hosp.—Res. Asst. M.O., £350. Jun. Asst. M.O., £150. Also Con. Obstetrician and Gynæcologist, 3 guineas per session.
West Bromwich, Hallam Hosp.—H.S., at rate of £200.
West Riding of Yorkshire County Council.—Asst. County M.O., £960.
Westminster Hosp., S.W.—Asst. Physician.
Wigan, Royal Albert Edward Infirmary and Dispensary.—H.S., at rate of £150.
Willesden General Hosp., Harlesden-road, N.W.—Res. Officer, at rate of £100.
Woolwich and District War Memorial Hosp., Shooters Hill, S.E. Res. M.O., £150. Also H.S., at rate of £100.
Worcester County and City Mental Hosp.—Asst. M.O., £350.
Worksop, Victoria Hosp.—Jun. Resident, £125.
Wrexham and East Denbighshire War Memorial Hosp.—Two Res. H.S.'s. Also Res. H.S. to Spec. Depts., each at rate of £150.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Blandford (Dorset) and Lutterworth (Leicester).

Specialist Medical Referee under the Workmen's Compensation Act, 1925, for Ophthalmic cases arising in the Bristol, Bridgwater, Wells, and Weston-super-Mare County Court Districts (Circuit No. 54). Also Medical Referee (Surgeon) for the same circuit. Applications for appointments should be addressed to the Private Secretary, Home Office, Whitehall, London, S.W.1, before March 30th.

Births, Marriages, and Deaths

BIRTHS

BENSON.—On March 2nd, at Southsea, the wife of Surgeon Lieut.-Comdr. (D) J. C. Benson, R.N.—a son.

BOWES.—On Feb. 28th, the wife of Dr. R. W. Wallace Bowes, Diss, Norfolk—a daughter.

EYTON-JONES.—On March 2nd, at Littlehampton, Sussex, the wife of Dr. F. M. M. Eyton-Jones—a son.

GORDON.—On March 7th, at Hanger Hill, Middlesex, the wife of Dr. Douglas Gordon, of Richmond, Surrey—a son.

JOHNSTON.—On Feb. 28th, at Hatch End, Middlesex, the wife of Dr. M. J. Johnston—a daughter.

LIVINGSTON.—On March 7th, at Glasgow, the wife of Dr. Bruce Livingston—a daughter.

O'SULLIVAN.—On March 5th, at Devonshire-place, the wife of Mr. Vincent O'Sullivan, F.R.C.S.—a son.

PROTHEROE SMITH.—On March 6th, at Topsham, Devon, the wife of Dr. E. H. Protheroe Smith—a daughter.

MARRIAGES

CONDON—TINDALL.—On Feb. 19th, at the Church of St. Charles, Ogle-street, W., Captain G. F. Condon, I.M.S., to Phyllis Margaret Tindall.

DEATHS

BILLUPS.—On March 5th, at Woking, Surrey, Christopher Robert Billups, M.R.C.S. Eng., aged 76.

DARBYSHIRE.—On March 3rd, at Highcliffe, Hants, Douglas Edward Darbyshire, M.B. Vict., formerly of Lincoln.

KIDDLE.—On March 4th, at Bow Common-lane, E., H. Harvard Kiddle, M.R.C.S. Eng., late Capt., R.A.M.C. and I.M.S.

NEWCOMBE.—On March 5th, Frank Newcombe, M.R.C.S. Eng., L.S.A., of Martock, Somerset, aged 83.

PRYCE MORRIS.—On March 4th, Thomas Harold Pryce Morris, M.R.C.S. Eng., of East Grinstead, Sussex, late of Eye, Suffolk, in his 69th year.

SHANN.—On March 8th, at Farnham, Knaresborough, Frederick Shann, V.D., M.R.C.S. Eng., J.P. (Surg. Lieut.-Col., Ret.), aged 88.

TEMPLETON.—On March 7th, at Edgbaston, James Templeton, M.R.C.S. Eng., aged 63.

WHITE.—On March 6th, in Cornwall, as the result of a fall of cliff, Percy Walter White, M.R.C.S. Eng., of Clifton, Bristol.

Sir JOHN LYNN THOMAS gratefully acknowledges hundreds of letters of sympathy from friends made at home and abroad during 46 years of travel, at the tragic accident to his wife whilst gathering flowers on Inland Harbour on the Tivy discovered through her help.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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NOTES, COMMENTS, AND ABSTRACTS

ENCEPHALITIS VIRUSES IN THE U.S.A. AND JAPAN

A FINAL report on neutralisation tests with virus isolated in the St. Louis epidemic of 1933 appears in the *Journal of Clinical Investigation* for January. The authors (R. S. Muckenfuss, J. E. Smadel, and E. Moore) have used four strains of this virus in testing the neutralising power of the serum of 365 persons living in the St. Louis area. Of these, 126 were said to have suffered from encephalitis during the epidemic; 139 were hospital patients who were supposed to have had no contact with the disease; 78 were known to have been in contact with encephalitis patients or with infected material; and 22 were young persons who had suffered from some form of encephalitis or meningo-encephalitis during the ten years preceding the St. Louis outbreak.

In the group of 126 persons who had had encephalitis the sera of 69 per cent. contained positive neutralising bodies, whilst the sera of 22 per cent. did not; in the remaining 9 per cent. the result was doubtful. In the other groups, totalling 239, the positives were not more than about 27 per cent., whilst the negatives were about 58 per cent., leaving 15 per cent. of doubtfuls. The difference in activity between the sera of the 78 known to have been in contact with infection, and the sera of the 139 without known contact, was almost negligible; in each group 55 per cent. were negative. In considering the results obtained from the 126 who were said to have had encephalitis no attempt was made to discard cases that had been diagnosed on what appeared to have been somewhat slender grounds, and the comparatively low percentage of positive results (69) obtained in this group may be partly explicable by the inclusion of doubtful cases. In two sets of experiments previously published the positive results in convalescent sera were 94 per cent. and 82 per cent. (Wooley and Armstrong 1934, Webster, Fite, Clow, and Muench 1935).

There seemed to be a loose correlation between the severity of the meningeal cellular reaction and the finding of protective antibodies in the sera of the patients. Convalescents with positive sera had had an average spinal-fluid cell count significantly higher than that of patients with negative sera.

JAPANESE OBSERVATIONS

Last April we gave a short account of the work done by a committee set up in 1933 to investigate the outbreaks of encephalitis that have been recurring in Japan at intervals since 1873. This disease has features that distinguish it from the epidemic encephalitis of von Economo and of the St. Louis outbreak.

The pathogenic agent is a filter-passing virus, and R. Inada, chairman of the committee, has lately produced a further report on it (*Pr. méd.* 1937, 47, 1885). He states that the infected brain kept at 0–4° C. in 50 per cent. glycerin remains virulent for 60 or even 100 days, which is a considerable longer time than was found by Webster and Fite for the St. Louis virus. Infection can be transferred to mice by minute quantities of brain emulsion injected intracerebrally; intranasal inoculation requires rather larger amounts, and for intraperitoneal infection relatively massive quantities are needed. Kasahara has infected mice by inoculation of virus emulsion into the sciatic nerve, whilst under identical experimental conditions subcutaneous inoculations proved negative. After cerebral inoculation into mice the virus has been found in the blood within 30 minutes and up to 60 hours afterwards. After intranasal infection, it is found in the olfactory lobe within 24 hours and in the brain itself about 6 hours later, attaining its maximum about the 3rd and 4th days, whilst in the blood and the viscera it is found within 48 hours, reaches its maximum on the 3rd or 4th day, diminishes on the 5th day, and has almost disappeared about the 7th or 8th day. When the inoculation is subcutaneous the results are quite different. The virus is found in the blood within 10 minutes of inoculation; in the viscera it is found after the 1st day and remains until the 5th day, after which it disappears. Thus, in the mouse, intranasal inoculations behave like intracerebral, subcutaneous like intraperitoneal. In the mouse inoculated intraperitoneally the blood plasma is found to contain more virus than the corpuscles. The virus has been noted in the urine of the mouse after intracerebral inoculation, and in the urine and bile as well as in the viscera of the rabbit after testicular inoculation.

In the monkey, as in the mouse, the intranasal route comes next to the intracerebral in giving the highest proportion of infections. Also in the monkey the virus is found in the peripheral nerves in the same amount as in the nerve centres; but is difficult to find in the viscera. In America it proved impossible to infect rabbits, but this has been done successfully in Japan, and Kasahara by intratesticular inoculations has transmitted the virus from rabbit to rabbit through seven passages. The effects in the rabbit differ somewhat from those in the mouse.

Kept at 1 or 2° C. the virus is highly resistant to drying. Blood virus kept in this way always remains infective for mice for 50 days, and brain virus as long as 100 days. At 25° C. drying destroys infectivity in 30 days, at 37° C. in 13 days. The virus is also resistant to cold, and is still active after exposure to minus 78° C. for 6 days, and to minus 172° C. for 3 days. Whilst it has about the same resistance to heat as that of microbes in general (exposure to 60° C. for half an hour destroys all infective power) it is rather more resistant to ordinary antiseptics.

Attempts have been made to reinfect animals that have previously been inoculated with human virus and have survived. So far the results seem to point to a measure of protection from the first attack. Much experimental work has also been done on the neutralising effect of convalescent serum, but the results obtained in Japan by different observers differ so widely that no dogmatic statement can yet be made. It is clear, however, from experiments in America that the serum of the Japanese convalescent has no neutralising effect on the St. Louis virus.

OVERFEEDING AND PROTEIN METABOLISM

Dr. D. P. Cuthbertson and his fellow-workers at the institute of physiology of Glasgow University have continued their study of the effect of overfeeding on the protein metabolism of man. In three papers published in the *Biochemical Journal* last April they showed that on the addition to an adequate basal diet of a litre of raw or boiled milk (or its equivalent in beef, lactose, and butter) body-weight increased and both nitrogen and sulphur were retained. Similar results followed an equivalent addition of soya bean, flour, lactose, and butter. The addition of glucose to the basal diet reduced the daily urinary output of sulphur and nitrogen.

In a fourth paper Cuthbertson, with J. L. McGirr and H. N. Munro, has examined the effect of muscular work at different levels of energy intake, with particular reference to the timing of the work in relation to the taking of food (*Biochem. J.* 1937, 31, 2293). The two subjects were over 6 ft. and over 5 ft. 4 in. in height and about 13½ st. and 10 st. in weight, and the basal (meatless) diets differed accordingly, yielding daily respectively 3533 and 2815 calories and containing 16·32 and 12·21 g. of nitrogen. Work was done on the bicycle ergometer of McCall and Smellie for periods of 55 minutes on two successive days in each series of experiments. It is worthy of note that the smaller and younger man did 48,000 kg.m. (=112 calories), while the other only did 43,100 kg.m. (=101 calories). The

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heavier work was found too fatiguing to be comfortably done in one spell and was divided over the day in a later series.

A prolonged period of surfeit of carbohydrates lowered the output of both nitrogen and sulphur and extra work done during the period on selected days raised the excretion of these elements to about the basal output when excess carbohydrate was not taken. The rise was much greater when work was done after meals and was of longer duration (maximum on first post-work day) than when the work was done before meals. On a basal diet also, work after meals makes a greater demand on the proteins of the body than work before meals. Extra carbohydrate taken at the next meal after a work period, in amount sufficient to cover the work, prevented a rise in nitrogen and sulphur excretion, but not if taken before. The authors suggest that the time-relationships offer some explanation of the diversity of results of different investigations into the effect of work on protein metabolism. This seems probable, and these experiments certainly seem to confirm the advice to rest after meals.

Carbohydrate ingested in excess of energy requirements is apparently used by the body to fill the glycogen stores in the liver and muscular and other tissues; when these can hold no more it is burnt in preference to fat or protein. Alimentary glycosuria may even develop as a means of getting rid of carbohydrate excess, but a more usual way is probably fat-formation. When an excess of carbohydrate is available the breakdown of proteins becomes less, and consequently the excretion of nitrogen and sulphur is reduced. The reason why food taken after work should effect a saving in nitrogen and sulphur is not clear, although various possibilities are discussed. Since excretion of these elements after work continues for some days it may be that, while the actual work is done at the immediate expense of carbohydrate reserves, the balance has to be made up again by using protein for carrying on normal activities during the reaccumulation period. If extra carbohydrate is taken during this recovery period it is utilised and deamination of protein is lessened.

CYANIDE POISONING

Ingegno and Franco, of the Long Island College Hospital, Brooklyn, N.Y., report two cases of cyanide poisoning successfully treated with intravenous sodium nitrite and sodium thiosulphate (*Industr. Med.* 1937, 6, 573).

The first patient was a man of 20 who was removing some cotton from a fumigating tank which had recently been filled with HCN gas. At 10.15 A.M. his fellow workers found him unconscious and not breathing, and he was given artificial respiration. At 10.45, when the ambulance surgeon arrived, he was still unconscious, and was flaccid and cyanotic, with contracted pupils and a rapid weak pulse. Adrenaline and carbogen (carbon dioxide and oxygen) were administered and by 12.15 P.M. he was breathing spontaneously and had a pink colour. At 12.30 he became very violent and his colour was slaty. He was given inhalations of amyl nitrite and 300 mg. of sodium nitrite in 10 c.cm. of water intravenously, followed by 25 g. of sodium thiosulphate in 50 c.cm. of water through the same needle, and later by Coramine and caffeine sodium benzoate. At 1.30 P.M. he vomited and his cyanosis was less, his pulse-rate then being 116 per minute and blood pressure 110/74 mm. At 2.15 the nitrite and thiosulphate were repeated in half the original doses and by 4 o'clock his colour was pink again and pulse-rate 100. At 6 P.M. he was fully conscious and able to speak, and he thereafter made an uneventful recovery. Electrocardiograms taken before, during, and after the second injection showed slight changes. Slurring developed in Q R S of L.2 and L.3 and the T waves increased in voltage from 1½ to 2½ mm. and T_3 became diphasic. A very small Q_1 disappeared and a definite Q_3 of 20 per cent. developed. These changes had gone 20 minutes after the injection. Spectroscopic examination of the blood 1½ hours after the first injection showed no abnormal blood pigments, but 1½ hours after the second injection there was 20 per cent. methæmoglobin and 80 per cent. oxyhæmoglobin.

The second man, aged 25, was admitted to hospital at 10 A.M. An hour before he had "taken one swallow" of a photographic solution containing 2 oz. of KCN and 1 drachm of iodine to the pint. He had promptly felt very sick, vomited, had difficulty in breathing and had lost consciousness. At the hospital he was unconscious and of a dusky hue; his respirations were laboured and he was foaming at the mouth. He was given inhalations of ammonia and caffeine subcutaneously, and his stomach was washed out with hydrogen peroxide. By 11 A.M. he was partially conscious, but his colour was still slaty and he had a rapid pulse and some tremors. At 11.20 A.M. he was given inhalations of amyl nitrite and intravenous injections of 300 mg. of sodium nitrite in 10 c.cm. of water and 12·5 g. of sodium thiosulphate in 25 c.cm. of water. At 11.30 A.M. he was put into an oxygen tent. He then improved rapidly and before noon was wanting a cigarette. At 1.20 the nitrite and thiosulphate were repeated in the same doses as before. His cyanosis had by then much improved and he was discharged well three days later.

These cases were probably instances of severe cyanide poisoning, and Ingegno and Franco say of them, "although there was some restoration as a result of immediate non-specific measures, the therapeutic efficacy of nitrite and thiosulphate in bringing about rapid and complete recovery cannot reasonably be denied." The results are, however, obscured by the multiplicity of the antidotes used, and it is perhaps unfortunate that no chemical tests were made of the blood of either patient. Certain effects were undoubtedly due to the specific treatment. Thus, the second man had nausea and palpitations after each injection, and the first developed methæmoglobinæmia and some transient but definite electrocardiographic changes after his second injection. Chen, Rose, and Clowes in 1934 showed experimentally that the combination of sodium nitrite and sodium thiosulphate intravenously protects dogs against 20 M.L.D. of 4–10 per cent. sodium cyanide injected subcutaneously, the action of the nitrite being prompt and of the thiosulphate comparatively slow. They suggested that nitrites first form methæmoglobin from hæmoglobin and that the cyanide then combines with the iron of the methæmoglobin to produce the less toxic compound cyanmethæmoglobin. In the same way sodium thiosulphate forms a less toxic compound, sodium sulphocyanate, by combining with cyanide and oxygen.

INCIDENCE OF TULARÆMIA

THE *Bulletin de l'Office international d'Hygiène publique* for December last contains further reports made to the Office in October on the prevalence of tularæmia. In Germany, Prof. Reiter said, special attention has been paid since the winter of 1930-31 to the incidence of this disease because of its prevalence in the neighbouring countries of Norway and Russia. At the time of the report 2 cases had occurred in the Reich, one in 1931 and the other in 1936, both being due to direct contact with infected animals. In order to prevent the introduction of the disease into Germany the transport of hares and rabbits, living or dead, had been prohibited from the following countries where tularæmia was prevalent—viz., Czechoslovakia, Austria, Hungary, Jugoslavia, Rumania, Bulgaria, Albania, Greece, and Turkey. Surgeon-General H. S. Cumming, delegate of the United States, stated that Vermont and Connecticut were the only States in which tularæmia had not yet been described. The mortality among 7077 cases reported from before 1924 to 1936 was 4·8 per cent. (345 deaths). Dr. Kling, the Swedish delegate, said that 30 cases had been notified in Sweden in 1931 and 51 in 1934, but after this no cases were reported until the end of July, 1937, when three persons in Central Sweden contracted the disease after contact with a hare. In the course of the next two months

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93 cases in which the diagnosis was confirmed serologically were reported in the same area. The present epidemic focus was in the immediate neighbourhood of the region in which the disease had been observed in 1934. Dr. L. Prochaska, of Czechoslovakia, reported that 418 cases had been notified in his country, of which 190 were in Moravo-Silesia, 121 in Slovakia, and 7 in Bohemia, of which 1 was an example of laboratory infection. The last human cases had been notified in April, 1937, but infected hares had been found in two districts in Slovakia last September and October.

EXPERIMENTS IN LIVING

Dr. Alexander Barton was born at Dover in 1861 and educated at Harrow, Caius College, and St. George's Hospital. Whilst in practice at Beckenham he became interested in aeronautics and built an airship which made a short flight before sharing the fate common to many of its kind. Undaunted by this disaster, he began to experiment with man-lifting kites and built the first hydroplane. Caloriculture and the making of non-alcoholic wines provided further outlets for his inventive impulses until he joined Rawson's staff as a consulting aeronautical engineer. The war called him back to medicine but the strain of running a large practice undermined his health which, however, was speedily restored at the King Edward VII Sanatorium at Midhurst. He subsequently became D.C.M.S., Ministry of Pensions, for Berkshire and Cambridge before retiring to Alassio where, under local anæsthesia, he was operated on for duodenal ulcer so successfully that he was up and about on the sixth day. Such is a bare outline of the contents of a book [1] which, as Dr. Barton explains in a foreword, he was urged by friends to write. His friends were wrong; not because he has not had an interesting life but because, as he himself admits, he has no literary gift. It is to be regretted that the material was not put into the hands of a practised writer, for the exploits of anyone so vigorous and versatile are undoubtedly worth recording in a style which presents them in graphic form.

FLOODS IN PARIS

Dr. Robert Richard gives an interesting account of Paris floods from the Middle Ages to the present day (*Thèse de Paris*, 1937, No. 790). Although inundations were reported as early as the sixth century of our era, it was not until 1125 that the first detailed description was given. In that year the flood was followed by famine and epidemics, and this happened again and again. It was not indeed until the middle of the nineteenth century that the immediate loss of life and material was not aggravated by starvation and outbreaks of infectious disease. The last great flood in Paris took place in 1910, when, despite considerable inconvenience and danger, the loss of life was fortunately very low, and thanks to the energetic action of the health authorities no epidemic followed. Similar precautions—disinfection, pasteurisation, desiccation of the inundated houses, and a campaign against mosquitoes and rats—proved successful during a flood in the Paris suburbs in 1930.

KERR ON ANGINA PECTORIS

THE career of William Watt Kerr is the subject of a sketch by H. C. Moffitt in the January issue of *California and Western Medicine*. Born in Edinburgh in 1857, the son of an architect, Kerr graduated there in 1881, in the same year as Conan Doyle. Influenced by two uncles and a brother who had been in California for several years in the mining industry, he left his native country to take up practice in San Francisco. As a student, obstetrics had been his favourite study, and with the triumphs of Listerism fresh in his mind he at first devoted himself to that specialty and to surgery. From 1887 to 1889 he was professor of therapeutics in the University of California and from 1889 until his death in 1917 professor of clinical medicine. In the horse-and-buggy days of medicine his consulting and private practice was extensive and onerous, for his genial, honest, and gentle personality radiated confidence, and he was an excellent diagnostician. Later, like many another doctor, he suffered from effort angina, and with curious intentness he studied the various manifestations of the advancing vascular changes. A remarkable account of experiments on himself appeared in a paper on the danger of hot baths in patients suffering from arteriosclerosis (1916). In March, 1917, he delivered his last clinical lecture—on angina—and referred to its graver sensations that cannot well be put in words. "There comes a moment," he said, "when the heart seems all too small to overcome the great pressure gathering in the chest. A massive column of blood seems surging upward and to the left and can find no outlet in passages that feel too rigid. And, rising from the chest, a constricting force grasps the throat and squeezes upward to the angles of the jaw." A month later he was dead.

A LAYMAN'S GUIDE TO ILLNESS

ONE of the drawbacks to books on symptomatology is that, although written with no such intention, they can hardly fail to alarm. The significance of many symptoms may be trivial or grave and the conscientious writer can say no more about them than that, except to refer the patient to his doctor, whither, no doubt, he would have gone in any case. Dr. Belfrage [1] is an apostle of what might be called the Periodic Overhaul School. Thus he would have the blood pressure of all middle-aged and elderly persons taken at regular intervals. Even the doctor, no less than the intelligent layman, may wonder how excessive smoking can be a cause of both hyper- and hypotension. There is the usual diatribe against constipation. Some of the notes on symptoms are curiously incomplete—for example, that on itching, in which no mention is made either of diabetes mellitus or jaundice as a possible cause; but whether or not such omissions are deplorable depends on whether a good theoretical knowledge of what symptoms may mean is more likely to enhance or to allay anxiety.

A REQUEST FROM SPAIN

The organising secretary of the Spanish Medical Aid Committee writes: "I have received a request from Spain for the *Annals of Surgery* for 1937 (Cassell and Co.) and *Surgery, Gynecology and Obstetrics* for 1937 (Baillière, Tindall and Cox). We are anxious to send these out to the surgeons who require them but are equally anxious not to draw on our funds for this purpose if it can possibly be avoided, and we wonder, therefore, whether any of your readers would be prepared to send us these for use in Spain." The committee may be addressed at 24, New Oxford-street, London, W.C.1.

FILM CAPTIONS FOR THE DEAF.—A correspondent suggests that captions such as are used for foreign talking films shown in this country should be shown on all films so that deaf people shall be able to follow the story. The coming of talkies has been a serious blow to the deaf, many of whom have lost all pleasure in this form of entertainment or instruction. Even the aids provided at some cinemas are acceptable only to a minority. Written captions would be welcomed by foreigners among the audience, as well as by the deaf, and our correspondent thinks that the rest of us would readily tolerate and learn to ignore them.

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[1] Jack of All Trades. By F. Alexander Barton, B.A. Cantab., M.R.C.S., A.F.R.Ae.S., late D.C.M.S., Ministry of Pensions. London: John Bale, Sons and Curnow. 1938. Pp. 225. 5s.

[1] Illness, Its Story and Common Symptoms. A Guide for the Layman. By S. Henning Belfrage, M.D. Lond. London: Humphrey Milford, Oxford University Press. 1938. Pp. 174. 3s. 6d.

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ADDRESSES AND ORIGINAL ARTICLES

THE PUBLIC HEALTH ASPECT OF HEART DISEASE IN CHILDHOOD *

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II

IN the preceding lecture the course of heart disease in childhood was considered from various aspects, and it was shown that with proper medical care the prognosis was likely to be favourable. In this lecture I would like to discuss the details of treatment and after-care of the rheumatic child, and to indicate possible ways of improving and extending this service.

Thornton (1937) has recently made a valuable comprehensive review of the London scheme for the treatment and supervision of juvenile rheumatism, and many of the comparative figures which follow are derived from his article.

One of the problems which confronts the doctor who has been looking after a child with rheumatism is to decide on the best form of treatment once the acute stage is over. Such questions as when the child can get up, whether he may attend school, the amount of exercise he can take, and what precautions are necessary in his future mode of life are bound to arise. None of them can be answered without reference to the child's "rheumatic state," since the future conduct of the case depends primarily on whether or not the rheumatic process is still active. This is of such importance that the doctor must be well acquainted with all the methods of estimating the stage which the disease has reached.

SIGNS OF RHEUMATIC ACTIVITY

The general condition of the child gives some information and a steady gain in *weight* is nearly always a propitious sign. Close attention to the *pulse-rate* gives the best indication of the actual state of the heart. Observations should be made for a number of days and comparison of the rate during sleep with the rate when the child is awake will help to differentiate a nervous tachycardia from active carditis (Schlesinger 1932). Recrudescence of rheumatic infection is often foreshadowed by a gradual quickening of the heart's action. Complete reliance cannot be placed on the *temperature*, since active rheumatism is so often an afebrile disease, and slight pyrexia may easily have other causes. Allowance should also be made for the normal temperature of each individual, for many rheumatic children give a fairly constant oral reading of 97° F., and they might reasonably be considered febrile with small rises in the region of 98·4° F. In others 99° F. is the normal temperature.

Extension of *physical signs* in the heart, such as further enlargement or involvement of other valves, points clearly to a smouldering cardiac inflammation. Finally, it is hardly necessary to point out that the presence of *nodules* or *chorea* is obvious evidence of active disease. Estimation of the *sedimentation-rate* of the red blood-cells is the most delicate test of all and is of the greatest value, provided it is considered in conjunction with other signs of activity. If there is any doubt, more than one observation should be made, and as it is a non-specific reaction, other febrile conditions must be excluded. Active rheumatic carditis, in the absence of gross failure, is associated with a high sedimentation-rate.

With a little practice the test can be easily performed by a prick of the finger; estimations can thus be made at fortnightly intervals, and the child should not be allowed to get up until the sedimentation-rate has fallen to normal (Payne and Schlesinger 1935). When subcutaneous nodules are present the sedimentation-rate is useful in determining the probable turn the disease will take. The first indication that nodules are about to vanish and that the general rheumatic inflammation will subside is a return of a high sedimentation-rate to normal. Conversely, a persistently raised sedimentation-rate is a clear indication that the end of the active phase has not been reached and that the nodules will remain for an indefinite period.

The prolonged character of rheumatic infection in childhood has been repeatedly emphasised, but it is only recently that clear-cut methods of assessing the "rheumatic state" have been established.

CONVALESCENT HOME TREATMENT

In the past lack of accommodation and a long waiting-list at the large city hospitals often made it necessary for children who had lately passed through an acute attack of rheumatism to be discharged home incompletely cured, with the rheumatic process still active. They were advised further rest, but under their unsatisfactory domestic conditions this could not be secured and they were often forced to come long distances to hospital out-patient departments for further medical supervision.

It was chiefly to obviate this that special country convalescent homes were founded, and it soon became apparent that an open-air life gave rheumatic children a much better chance of throwing off any residual infection. The scheme, however, entails more than the mere allocation of a country house for this purpose. To obtain the best results, the site should be carefully chosen and the buildings specially planned. A trained nursing staff is essential, and the doctors in charge should be well acquainted with the vagaries of the disease and must have the means of applying the clinical tests for rheumatic "activity" which have just been given. In fact, these special institutions should really be run more on the lines of a country hospital rather than on those of a country home; otherwise disappointing results may be expected. The continuation of some form of education is also important.

Many years ago Poynton (1912) urged the need for better convalescent treatment of rheumatic children in this country. It was left to the Invalid Children's Aid Association to put his doctrine into practice, and they opened the first special home for children with heart disease, the Edgar Lee, in 1912. In 1924 the same association provided a second and larger home, Kurandai, in Sussex, which was later transferred to West Wickham, Kent, with accommodation for 80 beds in specially designed open-air wards. Meanwhile a comprehensive scheme had been organised in Birmingham, and in 1921 Baskerville with 90 beds was set aside for the special educational

* The Milroy lectures for 1938, delivered before the Royal College of Physicians of London on Feb. 24th and March 1st. Lecture I appeared in our last issue.

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treatment of children recovering from chorea and carditis. In London the problem soon became too urgent and extensive to be dealt with entirely by individual or charitable organisations, and the Ministry of Health through the energetic influence of Sir George Newman and Sir Frederick Menzies sought to devise a national scheme. As a result in 1926 the London County Council set aside 60 beds at Carshalton for the purpose; this proved so successful that they extended the service to four special hospitals situated in the country, and they now have accommodation for 900 rheumatic children. This number, together with the additional 200 beds provided by the Invalid Children's Aid Association and other voluntary bodies—e.g., Hospital for Sick Children's home at Lancing and Cheyne Hospital at Chelsea—makes ample provision for London school-children,† and there is no reason why every case of incipient carditis should not have a proper period of convalescence. Other parts of the United Kingdom however, with notable exceptions, are not so well equipped for the treatment of rheumatic children (Board of Education 1937).

The incidence of juvenile rheumatism is known to be especially high in the large densely populated cities, so there is great need for an extension to other towns of the schemes existing in London, Birmingham, Bristol, Cardiff, and to a more limited extent in Liverpool and Leeds. There are hopeful signs that this will gradually be brought about. Improved convalescent arrangements are relatively recent in most of the cities mentioned, and Leicester and Sheffield have projects in view.

A few more observations remain to be considered before leaving the subject of convalescent homes. We have seen that their chief aim is first to ascertain the child's rheumatic "state," and, if this still proves active, to render it quiescent by further rest in open-air surroundings and by other measures directed to the improvement of the child's general health. On occasion this will necessitate the removal of local foci of infection, such as septic teeth and tonsils. Once the quiescent stage has been reached the patient may be allowed to get up for a gradually increasing number of hours, careful watch being kept on the heart and general condition. In this way the rheumatic child may be guided back to the grade of exercise and mode of life which he can comfortably lead in the future, and in the majority surprisingly few restrictions will ultimately be found necessary.

It is difficult to obtain reliable figures concerning the fate of rheumatic children treated at home and at special convalescent homes. To be strictly comparable the children would have to be drawn from one district. Glover (1930) has shown that the incidence and virulence of acute rheumatism is steadily declining, so that the observations would also have to be made over the same years in each series. A rough comparison might be made by taking the after-histories compiled by Wallace (1937) of 300 adolescents and young adults who had suffered from acute rheumatism and carditis in childhood. Wallace deals with children in Scotland, where, in his opinion, the same decline in the severity of the disease has not taken place, and this must presumably be taken into account. His cases had not received consistent convalescent treatment, and it is therefore of some significance to find that the mortality among them (25·6 per cent.) was double that of the West Wickham series (12·3 per cent.), for whom prolonged treatment in the country had been provided.

† This has been estimated as 1·7 beds per 1000 elementary school-children.

RELAPSES

A question often asked is how many relapses occur among rheumatic children after their discharge from convalescent hospitals. The answer is not simple, for much depends on the kind of home and school life to which they return, and on the number of times they are exposed to acute upper respiratory infections.

Recurrences of rheumatism are admittedly high; the figure is 35 per cent. among those who were discharged from West Wickham, and this is much lower than the 60–70 per cent. given by other investigators (Wallace 1937, Mackie 1926, Wilson, Lingg, and Croxford 1928).

One of the criticisms often levelled at the system of special convalescent homes is the risk of upper respiratory infections spreading through a community known to be particularly susceptible to them. This risk has not been overrated and its dire effect on the rheumatic child has been the subject of numerous communications. Unless proper precautions are taken, convalescence in these homes will certainly defeat its own object and may do more harm than good. The medical authorities in charge of these institutions should therefore make routine arrangements for dealing with this emergency, and the nursing staff must be alive to its danger.

Details of the existing scheme at West Wickham have been published elsewhere (Poynton and Schlesinger 1937). They are of such importance, however, that I would like to describe them shortly once again.

PROPHYLACTIC MEASURES IN REGARD TO TONSILLITIS

Acute nasopharyngitis in childhood often produces so few symptoms that it may pass unrecognised. A thorough examination of the throat must therefore be made whenever a child is indisposed or shows a sudden rise of temperature. The value of *aspirin* in preventing rheumatic relapses has already been mentioned in the first lecture. It must be given immediately after the onset of pharyngitis or tonsillitis and continued daily for four weeks. The dose, thrice daily, varies according to the age of the child: from five to eight years, 7 grains; from nine to fourteen, 10 grains; and above fourteen years, 10–12 grains.

Since the introduction of this form of prophylactic therapy at West Wickham serious relapses following tonsillitis rarely arise. On the occasions when fresh rheumatism or carditis does occur, it takes a much milder form, and virulent fatal forms of pericarditis are now seldom encountered. In some way the aspirin "damps" down the whole rheumatic process, and the intervening "silent" period between throat infection and relapse is often appreciably prolonged. Acute rheumatic fever with high temperature and considerable illness is replaced by a relatively milder form of "miniature rheumatic fever" (see Figure).

On the same grounds a course of aspirin should be given to rheumatic children as a routine after tonsillectomy.

Various measures are required to prevent epidemics of tonsillitis. A child with an acute nasopharyngeal infection should be strictly isolated until a throat culture shows no further evidence of hæmolytic streptococci. Glover (1930) has shown how "droplet infection" can spread the disease, and due regard should be paid to the prevention of this danger by proper spacing of the beds, adequate ventilation, avoidance of overcrowding, and regular sterilisation of the crockery and cutlery.

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Experience at West Wickham has shown that these are essential precautions.

RHEUMATISM CLINICS

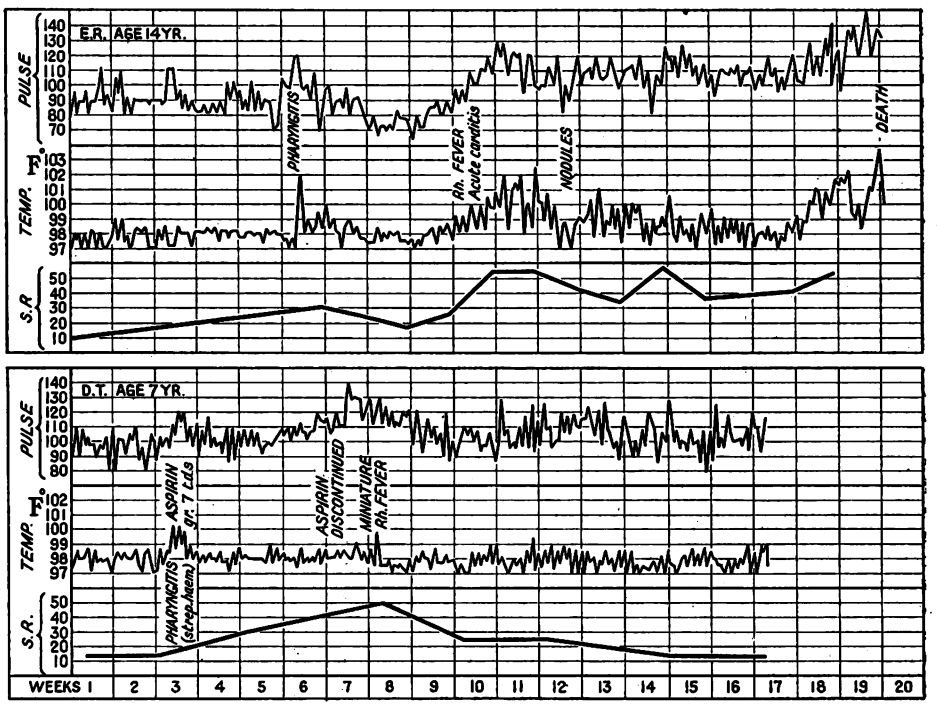
It is just ten years since the first two rheumatism clinics were opened in London. Afterwards the scheme extended rapidly and the city now possesses twenty such supervisory centres. Ten of them are staffed and equipped by the London County Council, and the remaining ten are organised in the out-patient department of certain of the voluntary hospitals, with a monetary grant from the Council. Similar centres have been provided by boroughs and county councils in the vicinity of London and in other parts of England, but they are still lacking in many districts, and the general scheme falls far short of that provided for tuberculosis throughout the kingdom.

The function of these clinics is to establish a diagnosis in doubtful cases and to supervise the health and life of rheumatic children, particularly those with heart disease. Patients are drafted to these centres by school medical officers, private doctors, physicians in various hospital departments, and after convalescence by the rheumatism section of County Hall. Thornton (1937) estimated that over 6000 children attended rheumatism clinics during 1935, and London may be congratulated on having inaugurated such a comprehensive scheme in place of the old haphazard method of treatment.

One or two mild criticisms of the system might be made. There is undoubtedly a difference of opinion at certain of the centres regarding the kind of life a child with an old cardiac lesion may be allowed to lead. The standard adopted for certification of children to attend a school for physical defectives (P.D. school) also varies considerably among the forty odd London certifying medical officers. Some school doctors in their zeal to prevent serious heart disease will keep children with the mildest cardiac lesions unnecessarily at a P.D. school, and so create a harmful atmosphere of semi-invalidism for the child and its parents. Other medical officers take up the opposite attitude and regard the P.D. school as a place only for children with seriously damaged hearts. These are obviously extreme views and most school doctors adopt an intermediate course. Naturally a certain amount of latitude must be allowed the certifying officer, who is best able to judge the merits of each case, and there also exists a kind of court of appeal at headquarters to whom any doubts or difficulties can be referred.

A certain lack of continuity in the method of treatment and after-care is also bound to arise with the present system, for it is more than likely that a rheumatic child will come under the care of a succession of doctors. The voluntary hospital would appear to provide the ideal arrangement, as in most cases in-patient treatment is followed by regular out-patient attendance after a period of convalescence. Unfortunately old out-patients are quite often seen by junior members of the medical staff and unless the hospital has a rheumatic clinic, or the physician in charge of out-patients is particularly interested in juvenile rheumatism, the after-care of these children with heart disease is left to a series of young doctors who have little experience of the disease. This is one of the reasons why it has been found desirable to supplement hospital attendance by school medical supervision, but here again there is no guarantee that the child will be seen by the same doctor at each examination; in any case this will cease at the age of 14 years if the child attends an ordinary elementary school. Moreover, the school doctor has no means of treating the rheumatic child, and should this be considered necessary he must be referred back to the hospital or rheumatism clinic. The school medical and hospital services still work somewhat apart and the liaison between the two might be closer, although the London County Council rheumatism section is endeavouring to improve this fault.

Lastly, we must not forget that it is the private practitioner who treats many children during the acute attack and supervises their health until they grow up. In many ways this is the best arrangement.



Effect of aspirin in preventing serious rheumatic relapses after acute throat infection. *Above:* Fatal case that did not receive this treatment. *Below:* One in which aspirin was given and the relapse was very mild. S.R. = Sedimentation-rate.

SPECIAL SCHOOLS

According to Thornton (1937) 16 per cent. of the children discharged from rheumatism hospital units

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are considered unfit to attend ordinary school and are therefore transferred to one of the Council schools for physical defectives. London has 29 such schools, and about half the pupils who attended in 1935 were cardiac cases, mostly of rheumatic origin.

The whole régime of these schools is specially arranged for the purpose. Children are transported to and from school by special conveyances; they remain at school for midday dinner and rest after the meal. The whole building is on the ground floor and is constructed on open-air lines. A nurse is in constant attendance and medical visits are paid once a fortnight. School periods are 5½ hours daily with about an hour's break for the midday meal and a rest. The leaving age is raised to sixteen and senior pupils have tuition in some form of handicraft such as dressmaking or embroidery, with an eye to future employment. Similarly the boys are taught the rudiments of certain trades which later in life may prove useful to them.

This arrangement for the proper education of children with heart disease is admirable, and there is nothing to compare with it in other countries. Certain of the other larger cities in England have made similar provision in open-air and special schools, but nowhere on the same scale as in London and Birmingham (Board of Education 1937). It is to be hoped that in the future existing deficiencies will be made good and that the scheme may eventually become national.

Naturally children at special schools are often envious of their healthy brothers and sisters who begin work at fourteen, while they have to remain at school for an extra year or two, and some parents also regard this as a waste of time. The general raising of the school age to fifteen may largely counteract this feeling, but at the same time those extra school years might be made more interesting. Some girls do not like sewing sufficiently to make it their work later, and to them the early training in shorthand typing offered in some P.D. schools is generally very acceptable. There seems to be no reason why these classes should not be extended to the rest of the P.D. schools. If it were also possible to include a course of domestic economy such as cooking and light laundry, it might hold their interest in school and at the same time train them to become good housewives for the future.

HOUSING

An important part of the London County Council rheumatism scheme is an attempt to ameliorate unsatisfactory home conditions. Since the rheumatic child is particularly susceptible to an unhealthy environment, it was realised that much of the good done by prolonged institutional treatment might be counteracted by the child returning to a damp ill-ventilated dwelling. Arrangements are therefore made for obtaining a detailed report of the home conditions of all children who receive institutional treatment. Structural and sanitary defects are reported to the borough medical officer of health who can take immediate action. Thornton (1937) states that during 1935, 225 reports of unsatisfactory housing conditions were received by the London County Council rheumatism section, as a result of which the defects present were remedied or alternative accommodation expedited. This scheme could well be more widely adopted throughout the country.

SOCIAL CONDITIONS

There are conflicting reports as to whether poor social conditions play a greater part in promoting rheumatism than other diseases in childhood. The conclusions reached by a Medical Research Council committee (1927) failed to reveal any differences or any special factor in the social circumstances of rheumatic children which might be described as causative. On the other hand the maternal care was found to be inferior, the amount of exposure greater, and the clothing less adequate among the rheumatic group than among the controls. Illness was also commoner among the parents of rheumatic children. Excess of starch and lack of fat in the diet has been blamed by some (Warner and Winterton 1935), and various vitamin deficiences have been held responsible by others. The marked influence of overcrowding on the incidence of rheumatic heart disease has been well demonstrated in Bristol (Bruce Perry and Roberts 1937).

Most of these factors can be related to unhygienic home surroundings, in which the mother is often unable to devote enough time and care to each member of a large family. Holidays in the country are short and in many cases quite out of the question, so that minor catarrhal infections or acute illnesses are apt to become protracted. Economic considerations are generally to blame and often there is actual poverty. There is no doubt that these circumstances have a bad effect on the general health of the child population of the large cities, and there is some evidence to show that rheumatism flourishes under these conditions.

I have been able to make a rough study in London of the social conditions in the families of 90 rheumatic children and to compare them with those of 90 non-rheumatic children who suffered from various other complaints.

The number of children in each family, the number of dwelling-rooms, the total family income, and the rents paid were all taken into consideration. The method of calculation adopted is open to some criticism and certainly many important subsidiary factors have had to be disregarded, yet it does seem that the families of the rheumatic group lived in worse circumstances than those of the controls.

TABLE I—SOCIAL CIRCUMSTANCES OF RHEUMATIC AND NON-RHEUMATIC CHILDREN

—	Rheumatic (90 families).	Non-rheumatic (90 families).
Number of children	496	310
Total family wages per week less rent	£210 6s. 1d.	£208 17s. 5d.
Average money available per person per week*	8s. 4d.	13s. 6d.
Total number of rooms ..	292	246
Average number of rooms per family	3¼	2¾
Average number of children per room (excluding parents accommodation)	1¾	1¼
Total rents paid	£66 1s. 5d.	£77 13s. 3d.
Average weekly rent for each family	14s. 8d.	17s. 3d.

* No calculation is made for fathers' expenses, such as fares to work, insurance, and other personal expenses of the parents.

Reference to Table I will show that less money was available per child and there was more overcrowding among the "rheumatic" families than among the others. This is largely accounted for by the difference in the size of the families in the two groups, although the total weekly wages are almost identical. The cases, however, were chosen at random and they are fair

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samples of London children who are recommended convalescence either for a rheumatic or some other complaint. A large family of children is an obvious way in which the financial resources may become strained, and this was apparently one of the main contingencies with which the "rheumatic" group had to contend (cf. Brockington 1938).

Faced with the problem of having to feed more mouths and requiring at the same time more rooms to live in, the difficulties were met by paying lower rents. There was no opportunity of making home visits, but one might hazard a guess that more rooms at a cheaper rate would probably affect the quality of the accommodation. Even with this economy in rent considerably less money was available for the clothing, feeding, health, and general upbringing of each individual child among the rheumatic group than among the controls. In this way the social level, the father's type of employment, and the wages earned may all be strikingly similar in rheumatic and non-rheumatic families and yet the living conditions can be very different. The numbers studied are far too small to enable me to dogmatise but they suggest that one important predisposing factor in juvenile rheumatism is a large family living on insufficient means.

MUNICIPAL AND NATIONAL CONSIDERATIONS

The existing arrangements for looking after the health of the rheumatic child and adolescent are somewhat complicated and differ in various parts of the country. As a rule the public health authority and the local education authority share the responsibility. The Board of Education also undertakes, with certain provisions, to make a grant to cover half the expenses incurred in this connexion by the local education authority. Such a scheme is admirable but can only be carried out in districts which possess the necessary accommodation for convalescent cases. This is still lacking in many districts, especially in the Midlands and the North (Glover 1935). Recently the Board of Education (1936) urged local authorities of the large industrial areas to make better provision for the rheumatic child, either by coöperating with the existing voluntary agencies or by creating their own residential schools.

So much seems to depend on the policy of the local public health and education authorities. Usually these two bodies are jointly administered by the same county borough council, and the success or failure of a rheumatism scheme will be largely influenced by the amount of enthusiasm shown by the local man, who so often combines the post of school medical officer and medical officer of health. The chief function of the Ministry of Health and Board of Education in these matters is to point out existing deficiencies and advise where improvements can be made. The responsibility rests with the local authorities, and it is to be hoped that what has been achieved in many of the large cities will eventually be adopted by all. The Board of Education is doing its best to encourage this and, as already mentioned, is always willing to give considerable financial aid.

EMPLOYMENT AND AFTER-CARE

The doctor's responsibility does not end when the child leaves school. This is an important stage in any child's life and especially so in those who have cardiac affections. The special care and supervision of the school medical service ceases, and young boys and girls find themselves suddenly at liberty and generally eager to begin work. Although still under parental care, control is no longer so easy, with the result that the life led by these young wage-earners is not always ideal.

The choice of employment is especially important. If the decision is left to the boy or girl, the tendency is to drift into occupations already chosen by elder healthy brothers and sisters. The type of work is not always suitable for old cardiac cases and a false step in this direction may end disastrously. Public health authorities in London and many of the larger cities, being fully aware of these problems, certainly do their best to launch the child leaving school into the most suitable career. Every child is medically examined during the last school year and if some condition is present which could be prejudiced by certain employments, a statement to this effect is made in the medical report. A school-leaving conference is held at about this time with the object of advising the parents as to the kind of work which, from the child's health and school record, would appear to be the best.

The *After-Care Association*, a voluntary body now in existence for thirty years, makes itself responsible for children who have been at P.D. schools. It is in touch with firms connected with over a hundred different occupations and trades, and is thus able not only to advise but also to place in the right sort of work most of those who are sent to them for help. In addition this association gives a great deal of other general assistance to these young people, who leave school somewhat incapacitated and yet well enough to earn a living.

The London County Council with the help of the *Juvenile Advisory Committee* deals with children who leave the ordinary elementary schools, among them being some of the less serious cases of heart disease. Their method is based on that of the After-Care Association, but as about 50,000 children leave the London elementary schools annually the follow-up system is less complete, despite the efforts of some five to six thousand voluntary visitors, who work under a skeleton service of London County Council officials (L.C.C. Annual Report 1936). Similar juvenile employment committees under the Ministry of Labour have been set up in most of the large industrial areas and render great service to young people leaving school.

One of the weak spots in this otherwise effective scheme has been the hiatus between the school-leaving age of 14 years and the age of 16, when the young person becomes insurable under the National Health Insurance Act. During these years there was no official medical supervision, an omission that was particularly undesirable in the case of rheumatic children with heart affections, and there are many with mild cardiac lesions who leave the ordinary elementary schools at fourteen. A new Act which comes into force on April 4th of this year fills the gap by enabling children leaving school and entering employment to obtain medical benefit and the services of a doctor pending their title to full insurance at the age of sixteen.

The special work of the After-Care Association for juvenile heart disease is confined to London; similar facilities are badly needed in the other large cities of the country. The obvious organisation to give the necessary impetus to this work throughout England is the *Central Council for the Care of Cripples*, a voluntary body of many years' standing who have recently been enriched by a gift of £125,000 from Lord Nuffield. With this money an extensive scheme is on foot for the improvement of treatment, after-care, and provision of suitable employment for young cripples in England and Scotland. It is therefore very regrettable to find that the plan is intended only for orthopædic cases, and that those with cardiac

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disorders are to be rigidly excluded. Perhaps those who are to administer the Nuffield Trust may be persuaded to alter their decision.

FACTORIES

Before leaving the industrial aspect of juvenile heart disease a brief consideration should be given to certain innovations embodied in the Factory Act 1937. Under the new Act there will now be facilities for re-examination, and an opportunity of revising the effect of work on an adolescent's health. Factory surgeons will no longer be faced with the dilemma of either giving a certificate of fitness to a doubtful case or of rejecting him altogether, knowing that the latter course would probably result in unregulated employment or shortage of food.

Closer coöperation and continuity of records between the school medical service and the certifying surgeons is also contemplated, and it is to be hoped that the health of the worker will be better safeguarded as a result. Heart cases in particular should benefit and be prevented from undertaking or continuing in work which might prove too arduous. It should certainly be mentioned that some employers provide a first-class medical service of their own. This is to be encouraged, provided there is the proper coöperation between this service and the certifying factory surgeon.

Occupations.—It is important to realise that factory posts do not necessarily entail heavy manual labour, and a good many of my old patients have found the work agreeable and not too strenuous. Others have entered various trades, some sedentary and some involving a certain amount of exercise or standing. Most of my old patients have accomplished this employment without detriment to their health (cf. Moon 1923). Office work and dress-making are popular occupations, and many cardiac cases have received preliminary training for these at school; a number have taken up domestic service; a few are married and have had children of their own. Harris (1937) has shown how essential proper medical attention is for women with heart disease when they become pregnant. Patients who attended my follow-up clinic and required such advice were always directed to hospital departments where they could obtain the right treatment.

The latest details of the further history of the 1000 old rheumatic patients reviewed in my first lecture are given in Table II.

TABLE II—FURTHER HISTORY OF 1000 CASES OF JUVENILE RHEUMATISM

At school	384	Elementary school ..	252
		P.D. school	96
		Various schools.. ..	36
In hospital	5		
At home	61	(15 married, 6 with children)	
At work—			
Factories	80		
Offices	77		
Dress-making	75		
Domestics	35		
Shop assistants ..	33		
Various trades	101	(Furriers, printers, hairdressers, messengers, packers, laundry maids, &c.)	
At work (unspecified) ..	26		
Dead	123		
Total	1000		

ECONOMIC CONSIDERATIONS

All the special measures for the benefit of children with heart disease which have been considered involve a certain amount of national expenditure and are, therefore, to a large extent a tax on the resources of healthy members of the community. Impartial consideration of this point, excluding all humanitarian principles, raises the question whether all the time and money spent on the care of these unfortunate people is really worth while. Those concerned with national economy must take this standpoint at times, particularly if they are to look with any favour on a proposed extension of the scheme. Before they are prepared to recommend this, public health authorities naturally want to know the ultimate effect of various existing measures, such as convalescent home treatment, rheumatism clinics, special schools, after-care work, school medical supervision, and conferences for vocational advice. If the net result is merely to ease the later years of a hopeless cardiac cripple or possibly prolong life for a short while under such circumstances, the service rendered could be counted merciful, but is strictly limited in its value to the State. Such sentiments may sound cold and calculating, but it is necessary to approach public health problems in a practical way.

One of the main objects of these lectures has been to investigate this very point, and I believe that the evidence produced not only vindicates the measures already in force against the disease, but gives strong justification for their wider extension. It has been shown, for instance, that juvenile heart disease has a better prognosis than is generally supposed, provided that those who suffer from it receive early prolonged care, and every effort is made to render their rheumatic condition quiescent. Those who have had wide experience of children with heart disease are convinced that a proportion recover completely—estimated at 30 per cent. by Carey Coombs (1924) and 37 per cent. by Morse (1931). In many others the cardiac damage is limited and of no serious consequence.

The fact that rheumatism becomes less dangerous after puberty is in my opinion one of the strongest indications for all the elaborate measures during childhood, which we have just considered. The idea that the various rheumatic schemes already in existence are mostly efforts to prolong the lives of useless invalids is far from the truth. This must be universely recognised if the extension of these public medical services is to receive the support it undoubtedly needs. Although juvenile heart disease can be very crippling, I have attempted to show that it is worth tackling with all the forces at our disposal. There will be disappointments, but the successes will more than counterbalance these, while those who have rheumatic children under their care will have the satisfaction of seeing numbers of them turn into useful citizens.

I should like to take this opportunity of thanking the Invalid Children's Aid Association, and particularly Miss Steggall, for their help in running the follow-up clinic, and also to the nursing staff of the Children's Heart Hospital, West Wickham, for their assistance in this investigation.

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BACTERICIDAL CHANGES INDUCED IN HUMAN BLOOD AND SERUM BY SULPHAMIDO-CHRYSOIDINE AND SULPHANILAMIDE

BY EDWARD D. HOARE, M.B. Camb.

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Colebrook, Buttle, and O'Meara (1936) showed that sulphanilamide exerted a bactericidal effect on hæmolytic streptococci when added to normal human blood in vitro, whereas no such effect was obtained by the addition of the disodium salt of 4'-sulphamido-phenyl-2-azo-7-acetylamino-1-hydroxynaphthalene 3:6-disulphonic acid (Prontosil soluble, hereafter designated PS in accordance with the nomenclature employed by Colebrook, Purdie, and others 1937). In the blood of mice and rabbits sulphanilamide had very much less effect. The blood of patients under treatment by sulphanilamide and also by the red dyes, the hydrochloride of 4' sulphamido-2:4-diamino-azobenzol (Prontosil rubrum, hereafter designated sulphamido-chrysoidine, Colebrook, Purdie, and others 1937) and PS in combination, was also shown to develop a considerable bactericidal power against hæmolytic streptococci.

It was suggested by Colebrook, Buttle, and O'Meara that the bactericidal power conferred upon the blood by sulphanilamide might well play an important part in the therapeutic effects obtained with these drugs in human beings. Nitti, Bovet, and Delpierre (1937) and Finklestone-Sayliss, Paine, and Patrick (1937) confirmed the bactericidal activity of sulphanilamide, and several other investigators have conceded at least a bacteriostatic action of the drug (Gay and Clark 1937, Long and Bliss 1937). Recently however Burgers (1937) has stated—without giving any data—that he was unable to confirm the findings of Colebrook, Buttle, and O'Meara. Domagk (1937) also has reported that while some antibacterial effect, "eine gewisse wirkung," could be obtained with "prontosil compounds"—which ones are not specified—in vitro against certain strains of hæmolytic streptococci, almost no such effect could be demonstrated with other strains notwithstanding that they were susceptible to the action of the drugs in the animal body.

Mayer (1937) confronted with this rather conflicting evidence concluded that the antistreptococcal effect of sulphanilamide in vivo was probably not due to any direct action of the drug as such on the microbe, but might be due to the production of some derivative of it in vivo, which had a greater bactericidal action.

In view of the importance of this question in its bearing upon the mode of action of these new drugs, it appears worth while to report such further evidence as has accumulated during the past year. The present paper provides data as to: (1) The bactericidal changes induced in the blood of three streptococcus-infected patients treated by sulphamido-chrysoidine and PS; and three treated by sulphanilamide (reference is made to similar results obtained in seven uninfected cases). (2) The bactericidal effect obtained with normal human blood to which sulphanilamide had been added in vitro, against different strains of hæmolytic streptococci. (3) The parts played by the serum and the cellular constituents respectively in the bactericidal effect obtained with blood containing sulphanilamide.

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BACTERICIDAL CHANGES IN BLOOD OF PATIENTS UNDER TREATMENT

Experimental methods used.—The defibrinated blood of a patient and of a normal control were implanted with graded quantities of a culture of hæmolytic streptococci ("Richards," a Type 3 strain belonging to Group A Lancefield) which had been rendered highly virulent for mice by repeated mouse passage. The implanted samples of blood were incubated in sealed tubes on a rotating drum (Todd 1927) and samples taken at intervals to determine the fate of the streptococci. In a few experiments the implanted bloods were incubated in slide cells (Wright, Colebrook, and Storer 1923) and the number of colonies subsequently determined. Incubation was at 37° C. Estimation of the free sulphanilamide in the blood was kindly done by Dr. Fuller by the method he described (1937).

Patients Treated by Sulphamido-chrysoidine and PS

CASE 1.—Localised uterine infection. Culture showed hæmolytic streptococci Group A in the vaginal swab. Blood and urine cultures sterile. Dosage: 0·5 gramme PS twice daily by injection; 0·6 g. sulphamido-chrysoidine three times daily by mouth. The results of the bactericidal tests are shown in Table I.

CASE 2.—Uterine infection with extra-uterine spread. Culture showed hæmolytic streptococci Group A in the vaginal swab. Blood and urine cultures sterile. Dosage: 0·6 g. sulphamido-chrysoidine three times daily by mouth. The results of the bactericidal tests are shown in Table II.

CASE 3.—Local uterine infection. Cultures showed hæmolytic streptococci Group A in the vaginal swab. Urine and blood cultures sterile. Dosage: 0·5 g. PS twice daily by injection; 0·6 g. sulphamido-chrysoidine three times daily by mouth. The results of the bactericidal tests are shown in Table III.

The blood of Case 1 killed the largest number of streptococci used for the test (850) on the third day of treatment and the blood from Case 2 on the fifth day of treatment 1350 cocci (again the largest number used). The blood of Case 3 gave no bactericidal effect 6 hours after the first dose, but after 24 hours just failed to kill 800 cocci. On the fourth day of treatment the blood killed the largest number of streptococci used (1050), and the serum from the same blood just failed to kill the same number. These results confirm those already reported by Colebrook, Buttle, and O'Meara (1936).

Patients Treated by Sulphanilamide

CASE 4.—Severe local uterine infection with mild septicæmia. Culture showed hæmolytic streptococci Group A in the vaginal swab. Urine culture sterile. Blood culture 1 colony of hæmolytic streptococci in 4 c.cm. of blood. Subsequent blood cultures sterile. Dosage: 1·5 g. sulphanilamide three times daily by mouth. The results of the bactericidal tests are shown in Table IV.

CASE 5.—Moderately severe local uterine infection. Cultures showed hæmolytic streptococci Group A in the vaginal swab. Blood culture sterile; urine culture *Bacterium coli*. Dosage: 1·0 g. sulphanilamide three times daily by mouth. The results of the bactericidal tests are shown in Table V.

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TABLES I–VI—ROTATING-TUBE METHOD

I—(CASE 1)

Treatment (PS = prontosil soluble; SC = sulphanilamide chrysoidine; Sulph. = sulphanilamide; rec. = received).	Cocci implanted in 200 c.mm. of blood.	Cocci surviving after 24 hours in 200 c.mm. of—		Concentration of free sulph. in patient's blood.
		Control blood.	Patient's blood.	
First day—				
Before PS & SC ..	25	26×10^6	20×10^6	..
1 hr. after 1st dose	25	26×10^6	20×10^6	1/107,000
Second day—				
3 hrs. after PS & SC (total rec. 4·4 g.).	35	42×10^6	45×10^6	1/85,000
	200	66×10^6	$1{\cdot}5 \times 10^6$	
Third day—				
5 hrs. after PS & SC (total rec. 7·7 g.).	220	32×10^6	0	1/58,000
	850	30×10^6	0	

II—(CASE 2)

First day—				
Before SC	40	7×10^6	10×10^6	..
Fifth day—				
2 hrs. after SC (total rec. 7·8 g.).	65	15×10^6	0	Not estimated.
	310	21×10^6	0	
	1,350	21×10^6	0	

III—(CASE 3)

First day—				
Before PS & SC ..	54	6×10^6	0	..
	290	8×10^6	4×10^6	
6 hrs. after 1st dose.	16	$1{\cdot}6 \times 10^6$	100	1/200,000
	180	$3{\cdot}2 \times 10^6$	Inf.	
Second day—				
3 hrs. after PS & SC (total rec. 3·9 g.).	160	$3{\cdot}6 \times 10^6$	0	1/100,000
	800	12×10^6	40	
Third day—				
3 hrs. after PS & SC (total rec. 6·7 g.).	235	Inf.	0	1/76,900
	1,175	Inf.	0	
Fourth day—				
3 hrs. after PS & SC (total rec. 9·5 g.).	38	8×10^6	0	1/73,700
	210	Inf.	0	
	1,050	Inf.	0	
Serum from above blood.	38	Inf.	0	1/81,200
	210	Inf.	200	
	1,050	Inf.	300	

IV—(CASE 4)

First day—				
Before sulph. ..	150	120×10^3	17×10^3	..
	720	1×10^6	8×10^6	
1 hr. after	720	1×10^6	0	1/45,000
	3,600	3×10^6	0	
Third day—				
5 hrs. after sulph. (total rec. 10·5 g.).	5,000	24×10^6	0	1/45,000
	10,000	24×10^6	0	
Fifth day—				
1 hr. after sulph. (total rec. 19·5 g.).	17,000	..	0	1/26,000
	451,000	..	0	
Serum from above blood.	650	..	0	..
	17,000	..	150×10^3	
	451,000	..	630×10^3	

V—(CASE 5)

First day—				
Before sulph. ..	100	24×10^6	$1{\cdot}2 \times 10^6$	..
	570	24×10^6	$1{\cdot}5 \times 10^6$	
1 hr. after	100	24×10^6	45×10^3	None.
	570	24×10^6	54×10^3	
Second day—				
4 hrs. after sulph. (total rec. 4·0 g.).	1,200	32×10^6	0	1/57,000
	6,000	34×10^6	0	
Third day—				
5 hrs. after sulph. (total rec. 7·0 g.).	1,250	45×10^6	0	1/41,000
	6,250	45×10^6	0	

VI—(CASE 6)

First day—				
Before sulph. ..	300	24×10^6	$2{\cdot}1 \times 10^3$	..
	7,500	26×10^6	10×10^6	
1 hr. after (total rec. 1·0 g.).	300	24×10^6	0	1/55,000
	7,500	26×10^6	0	
Third day—				
5 hrs. after sulph. (total rec. 7·0 g.).	825	51×10^6	0	1/54,000
	4,125	60×10^6	0	

CASE 6.—Local uterine infection. Cultures showed hæmolytic streptococci Group A in the vaginal swab. Urine and blood cultures sterile. Dosage: 1·0 g. sulphanilamide three times daily by mouth. The results of the bactericidal tests are shown in Table VI.

All three patients developed high bactericidal powers in their bloods. The blood of Case 1 on the fifth day of treatment killed 451,000 cocci (the largest number of cocci used in this test), and the serum from this blood killed 650 cocci and showed a bacteriostatic effect on the larger implants.

In contrast with the results obtained with sulphamido-chrysoidine and PS, two patients under treatment by sulphanilamide (Cases 4 and 6) developed a considerable bactericidal power in their blood within an hour of the first dose.

Similar results were obtained in a series of six uninfected normal women in the puerperium who received sulphanilamide by mouth. These bactericidal results will be published in detail at a later date.

CHANGES IN NORMAL BLOOD WITH SULPHANILAMIDE ADDED IN VITRO

Plan of the experiments.—Appropriate solutions of sulphanilamide were made and one volume of each added to four volumes of freshly defibrinated normal human blood to give the required concentration of the drug. Control blood received a similar addition of saline. The mixtures were implanted with streptococci and treated as described above.

TABLE VII—RESULTS OF BACTERICIDAL TESTS ON NORMAL HUMAN BLOOD TO WHICH SULPHANILAMIDE WAS ADDED IN VITRO: SLIDE-CELL METHOD.

READING AFTER 7 HOURS' INCUBATION

Cocci implanted		505	101	25
Normal blood containing—				
Saline		Inf.	96	22
Sulph.	1/500,000 ..	Inf.	70	4
	1/100,000 ..	0	0	0
	1/50,000 ..	0	0	0
	1/10,000 ..	0	0	0

READING AFTER 24 HOURS' INCUBATION

Normal blood containing—				
Saline		Inf.	Inf.	Inf.
Sulph.	1/500,000 ..	Inf.	Inf.	Inf.
	1/100,000 ..	Inf.	Inf.	Inf.
	1/50,000 ..	Inf.	Inf.	0
	1/10,000 ..	0	0	0

Inf. = uncountable number of colonies. The figure 4 = number of colonies formed.

The contents of cells showing no colonies after 48 hours' incubation were planted into blood-agar plates to show that the cocci were killed and not merely inhibited. In no instance did any growth occur.

Summary of results.—The results obtained by the slide cell method are shown in Table VII. A concentration of sulphanilamide of 1/50,000 in the blood produced some killing power, whilst a concentration of 1/10,000 produced a much greater effect.

The rotating-tube method has proved more satisfactory and the results obtained by this method are shown in Table VIII. The maximum bactericidal effect was obtained with a concentration of sulphanilamide in the blood of 1/16,000, and beyond that concentration the bactericidal power of the blood remained the same. With the lowest concentration

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of sulphanilamide tested, 1/128,000, a small bactericidal effect was still seen.

These figures are of interest from the clinical point of view. Estimation of the free sulphanilamide in the blood of a series of nine patients who were given sulphanilamide by mouth (the results in three cases are recorded here in detail in this paper) showed that it was present in concentrations varying from 1/100,000 an hour after the first dose, up to 1/20,000 after 24 hours' treatment. On the average it was found that the concentration of free sulphanilamide in the blood of treated patients was about 1/40,000. At a concentration of 1/40,000 free sulphanilamide in the blood, the blood had in most cases a good bactericidal power, so that from a theoretical point of view a good curative effect could be expected, and from the clinical point of view this curative effect was usually observed.

Table IX shows the bactericidal effect obtained from normal human blood to which sulphanilamide was added in vitro, against different strains of streptococci. Only 2 out of 21 strains were found to be insusceptible to the action of sulphanilamide in vitro (one of these strains belonged to Type 6, the other one was undetermined).

TABLE VIII—RESULTS OF BACTERICIDAL TESTS ON NORMAL HUMAN BLOOD TO WHICH SULPHANILAMIDE WAS ADDED IN VITRO: ROTATING-TUBE METHOD

Cocci implanted		4000	800	180	40
Normal blood containing— Saline		Inf.	Inf.	Inf.	Inf.
Sulph.	1/128,000 ..	Inf.	20×10^3	0	0
	1/64,000 ..	Inf.	0	0	0
	1/32,000 ..	0	0	0	0
	1/16,000 ..	0	0	0	0

LARGER NUMBER OF COCCI IMPLANTED

Cocci implanted		350×10^3	70×10^3	14×10^3	3×10^3
Normal blood containing— Saline		Inf.	Inf.	Inf.	Inf.
Sulph.	1/32,000 ..	Inf.	Inf.	160	0
	1/16,000 ..	Inf.	22×10^3	0	0
	1/8,000 ..	Inf.	25×10^3	0	0
	1/4,000 ..	Inf.	28×10^3	0	0

The figures indicate the number of streptococci surviving in 200 c.mm. of blood after 24 hours.

TABLE IX—RESULTS OF BACTERICIDAL TESTS ON DIFFERENT STRAINS OF HÆMOLYTIC STREPTOCOCCI. (ALL GROUP A LANCEFIELD.)

Strain.	Source.	Type.	Mouse virulence.	Method of testing.	Concentration of sulph.	Result.
1	Puerperal infec.	6	Avirulent.	R.T.	1/10,000	−
2	„	..	Not tested.	„	„	+ + +
3	„	..	„	„	„	+ +
4	Surgical sepsis.	25	„	„	„	+ + +
5	Puerperal infec.	..	Avirulent.	„	„	−
6	„	11	„	„	„	+ + +
7	„	..	Not tested.	„	„	+ + +
8	Surgical sepsis.	..	„	„	„	+ + +
9	Puerperal infec.	3	Avirulent.	„	„	+ + +
10	„	25	„	„	„	+ + +
11	„	..	Not tested.	„	„	+ + +
12	„	..	„	„	„	+ + +
13	„	27	Avirulent.	„	1/8,000	+ + +
14	„	..	„	„	1/16,000	+ + +
15	Erysipelas.	25	Virulent.	„	„	+ + +
16	Puerperal infec.	1	Not tested.	S.C.	1/10,000	+ + +
17	„	6	„	„	„	+ +
18	„	12	„	„	„	+ + +
19	„	9	„	„	„	+ + +
20	„	13	„	„	„	+ + +
21	„	3	Virulent.	R.T.	„	+ + +

R.T. = Rotating tube; S.C. = slide cell.
In the last column − = no bactericidal effect; + + = moderate bactericidal effect; + + + = strong bactericidal effect.
Strains 1–8 were tested by Dr. L. Colebrook, to whom I am indebted for his permission to publish the results.

TABLES X AND XI—RESULTS OF BACTERICIDAL TESTS ON SERUM: CELL MIXTURES

X—SLIDE-CELL METHOD

Cocci implanted ..	3500	700	140	30	Free sulph. in mixtures.
Patient's serum— Patient's cells ..	0	0	0	0	1/30,000
Normal „ ..	0	0	0	0	1/65,000
Normal serum— Patient's cells ..	Inf.	Inf.	Inf.	Inf.	1/250,000
Normal „ ..	Inf.	Inf.	Inf.	Inf.	None.

Inf. = uncountable number of colonies.
0 = no colonies formed.

XI—ROTATING-TUBE METHOD

Cocci implanted ..	1750	330	64	12	Free sulph. in mixtures.
Patient's serum— Patient's cells ..	2×10^3	0	0	0	1/38,500
Normal „ ..	0	0	0	0	1/78,000
Normal serum— Patient's cells ..	36×10^6	40×10^6	60×10^3	0	1/220,000
Normal „ ..	92×10^6	80×10^6	84×10^6	80×10^6	None.

The figures indicate the number of streptococci surviving in 200 c.mm. of reconstituted blood after 24 hours' incubation.

PART PLAYED BY SERUM AND CELLULAR CONSTITUENTS

The following experiments were done to determine whether the bactericidal effect observed in blood to which sulphanilamide had been added in vitro was due to the presence of the drug in the serum or to an increased activity on the part of the leucocytes.

The blood of a patient receiving sulphanilamide and a normal blood were centrifuged and the serum removed. The cells were washed four times in saline and centrifuged. Four mixtures were then prepared:

1. Patient's serum: Patient's cells.
2. „ „ : Normal cells.
3. Normal serum: Patient's cells.
4. „ „ : Normal cells.

The cell: serum volume was the same with both bloods, and this proportion was maintained in the final reconstituted bloods. The mixtures were implanted with streptococci and incubated at 37° C. in slide cells. The results are shown in Table X.

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This experiment was repeated later and the mixtures incubated on the rotating drum. The results are shown in Table XI.

It can be seen in Tables X and XI that a bactericidal effect was only obtained in those reconstituted bloods which contained the patient's serum, indicating that it was the serum containing the free sulphanilamide which was primarily responsible for the bactericidal effect.

In view of this result further experiments were done using serum to which sulphanilamide had been added in vitro.

The procedure was the same as that followed for the in-vitro addition of sulphanilamide to blood, with the substitution of serum for blood.

The results are shown in Table XII. The maximum killing power was obtained with a concentration of sulphanilamide in the serum of 1/8000. Concentrations of 1/32,000 and 1/64,000 gave a very poor bactericidal effect, and at 1/128,000 no killing power was demonstrated.

TABLE XII—RESULTS OF BACTERICIDAL TESTS ON NORMAL HUMAN SERUM TO WHICH SULPHANILAMIDE WAS ADDED IN VITRO: ROTATING-TUBE METHOD

Cocci implanted		3000	600	160	35
Normal serum containing— Saline		Inf.	Inf.	Inf.	Inf.
Sulph.	1/128,000	Inf.	Inf.	Inf.	Inf.
	1/64,000	Inf.	18×10^3	11×10^3	0
	1/32,000	16×10^3	60	0	0
	1/16,000	6,400	0	0	0

HIGHER CONCENTRATIONS OF SULPHANILAMIDE

Cocci implanted		312,500	62,500	12,500	2,300
Normal serum containing— Saline		Inf.	Inf.	Inf.	Inf.
Sulph.	1/16,000	7,000	2,000	1,900	600
	1/8,000	6,000	40	0	0
	1/4,000	2,800	40	0	0

The figures indicate the number of streptococci surviving in 200 c.mm. of serum after 24 hours' incubation.

These results differed in several respects from those obtained when sulphanilamide was added to whole blood in vitro. In the case of whole blood, the maximum effect was obtained with a concentration of sulphanilamide of 1/16,000, although the maximum number of streptococci killed was not as large as in the case of serum. In lower concentrations the blood produced a better bactericidal effect than the serum. In order to compare the results obtained with blood and serum more accurately, an experiment was done using blood and serum taken at the same time. The result is shown in Table XIII.

In concentrations of sulphanilamide of 1/8000 and 1/16,000 the serum killed more cocci than the blood, although the difference was not very large. The bactericidal effect probably depends on two main factors, one being the concentration of sulphanilamide and the other the leucocytes. When the concentration of sulphanilamide is low, the blood kills more cocci than the serum because of the presence of the leucocytes in the blood, the phagocytes in this case playing a relatively important part. When, however, the concentration of sulphanilamide is high, this becomes the important factor and the part played by the leucocytes becomes of less importance. Fuller (unpublished) has shown that sulphanilamide in blood is divided between the serum and the red cells in the ratio of 2:3, and therefore if the concentration of the sulphanilamide in the blood is 1/16,000 the concentration of the drug in the serum of that blood will only be 1/20,000. This adsorption of the sulphanilamide to the red cells probably explains the slight superiority of the serum over the blood in high concentrations of sulphanilamide.

TABLE XIII—RESULTS OF BACTERICIDAL TESTS ON NORMAL HUMAN BLOOD AND SERUM TAKEN AT THE SAME TIME, TO WHICH SULPHANILAMIDE WAS ADDED IN VITRO: ROTATING-TUBE METHOD

Cocci implanted		175,000	35,000	7,000
Normal blood containing— Saline		Inf.	Inf.	Inf.
Sulph.	1/16,000	Inf.	2,600	1,280
	1/8,000	Inf.	1,560	500
Normal serum containing— Saline		Inf.	Inf.	Inf.
Sulph.	1/16,000	1,240	560	0
	1/8,000	260	0	0

The figures indicate the number of streptococci surviving in 200 c.mm. after 24 hours' incubation.

DISCUSSION

In attempting to explain the therapeutic effect of the red prontosils and sulphanilamide two theories have been predominant: the one that this effect was chiefly due to a direct action of sulphanilamide upon the coccus (Colebrook, Buttle, and O'Meara 1936, Nitti, Bovet, and Delpierre 1937); the other that any such action was only ancillary to the operation of the cellular defence mechanism of the body (Gay and Clark 1937, McKinley and Mellon 1937, Long and Bliss 1937, Osgood and Brownlee 1938).

On the evidence available at present it would not be profitable to discuss these alternatives at length, and certainly it would be premature to assert that one or the other affords a complete explanation of the therapeutic effects obtained. The experiments here recorded provide somewhat more adequate data than has been presented hitherto as to the bactericidal and bacteriostatic effects of sulphanilamide in vitro, and they make it clear that these effects are to a large extent independent of the activity of the phagocytes. They also show that the large majority of the strains of hæmolytic streptococci (Group A Lancefield) so far tested are susceptible to the bactericidal or bacteriostatic action of sulphanilamide. This latter finding is at variance with the experience of Domagk (1937), but the reason for this discrepancy is not difficult to detect. Domagk's experiments, in which he found only two out of seven strains of hæmolytic streptococci susceptible to sulphanilamide in vitro, were carried out with rabbit's blood, and he used only one rather large implant of streptococci (one drop of a 24-hour culture diluted 100-fold). It was pointed out by Colebrook, Buttle, and O'Meara that the bactericidal and bacteriostatic effect of sulphanilamide was very much smaller with the blood of rabbits and mice than with human or monkey blood, and Colebrook has frequently found that a bactericidal or bacteriostatic effect may be overlooked when a very large implant of streptococci is employed, while it is detected with a smaller test dose. The present paper also offers examples of this.

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With regard to the minimum effective concentration of sulphanilamide in the blood, Osgood and Brownlee (1938) consider that 1/100,000 would be adequate. The results of the in-vitro addition of sulphanilamide to human blood and serum recorded in this paper suggest that a minimum concentration of 1/60,000 is desirable, and that concentrations even higher than this would probably produce more certain clinical effects.

SUMMARY

1. A considerable bactericidal power against hæmolytic streptococci was demonstrated in the blood of 12 patients. No such bactericidal power was present in the blood of normal untreated controls. Of 3 patients under treatment by sulphamido-chrysoidine and PS 2 were studied in detail. In these the killing power was present in one on the second day and in the other on the third day of treatment. Another 9 patients were under treatment by sulphanilamide. In contrast with the 3 patients above, 5 of the 9 developed a killing power in their blood within an hour of the first dose. In no instance when repeated tests were done during treatment was there a failure to demonstrate a bactericidal effect.

2. The addition of sulphanilamide to normal human blood showed that the maximum bactericidal power was obtained with a concentration of 1/16,000, although concentrations as low as 1/64,000 gave good results. These figures agree very closely with those obtained from patients who received the drug by mouth, when it was found that a good bactericidal effect was obtained from all bloods containing 1/60,000 free sulphanilamide or more. A series of 21 strains of hæmolytic streptococci was tested against normal human blood to which sulphanilamide had been added in vitro. Only 2 of these strains were insusceptible to the action of sulphanilamide, and both came from human infections that failed to respond clinically to the administration of sulphanilamide.

3. Experiments are recorded which indicate that it was the serum containing free sulphanilamide which was primarily responsible for the killing power which the blood of patients receiving sulphanilamide developed, and which could be induced in normal human blood by the addition to it of sulphanilamide.

4. A considerable bactericidal power was demonstrated in normal human serum to which sulphanilamide had been added in vitro.

I acknowledge with grateful thanks Dr. L. Colebrook's constant interest and advice in this work. My thanks are also due to Dr. D. Colebrook for her determinations of the type of the strains of hæmolytic streptococci recorded in Table IX, and to Dr. Fuller for his estimations of free sulphanilamide in the blood.

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SUDDEN DEATH FROM VON GIERKE'S (GLYCOGEN) DISEASE

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SOME 40 cases of this disease have now been reported from either a clinical or a pathological aspect since the condition was first recognised as an entity by von Gierke in 1929. None, however, has taken the form of a case of sudden death requiring a medico-legal examination, and there is as yet no description of the disease as a cause of unexpected death in youth. One of us (E. G.) examined a case of sudden death in a breast-fed infant of three months, in which the principal finding was a remarkable enlargement of the heart, and which at the time was thought to be, in all probability, a case of von Gierke's disease. Within a few weeks K. S. made a similar examination on a schoolboy of 11 who had suddenly collapsed and died in the street; on this occasion, owing largely to facilities for immediate laboratory examination, an equally remarkable cardiac enlargement, also the principal finding, was proven beyond question to be due to glycogen disease.

Since hypoglycæmia is one of the most constant features of the disease it might be expected that serious symptoms—drowsiness, incoördination, convulsions, or collapse—should be somewhat frequent, and sudden death a possibility; but this has not been so. Indeed symptoms of hypoglycæmia have been uncommon, and in this respect the two cases reported here provide no new departure. Each death appears to have been due to cardiac muscle failure, and until fatal collapse took place both subjects had enjoyed quite good health; an attack of jaundice, occurring 10 months before death and lasting two weeks, and in the older of the two subjects only, was the sole evidence of ill health of any kind before sudden death; it was, as is now clear, a herald of the disease.

It must be made perfectly clear that of the two, only the schoolboy gave unquestionable proof of the nature of the disease; the post-mortem appearances were so pronouncedly like those of von Gierke's disease that immediate histochemical tests were made on the heart muscle, liver, and kidney and confirmation obtained. The case of the infant is put forward only as one of probable von Gierke's disease in order to draw attention to the possibility in cases that hitherto may have been regarded as examples of "cardiomegaly" without apparent explanation. In spite of the reputed stability of the glycogen accumulations in the disease examination should not be delayed. As it was seen in a district which was then without laboratory facilities for medico-legal work, and being only months old and showing none of the pronounced features of the schoolboy, the infant was at the time regarded as one of some unusual developmental or metabolic cardiomegaly; changes were apparently confined to the heart, and this organ alone was preserved for further examination. When this took place some days later no glycogen was to be demonstrated, but the structural features of the heart muscle were identical with those of glycogen disease. In view

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of these facts the case of the schoolboy with clear proven von Gierke changes will be described first.

CASE REPORTS

It will facilitate reference to recognised features of the disease if they are summarised before the details of the two cases are given. The disease is characterised as follows: (1) it occurs in youth; (2) it is an isolated phenomenon or may affect two or more sibs. There is also (3) infantilism, and obesity; (4) smooth enlargement of the liver, heart muscle, and kidney, due to glycogen infiltration; and (5) occasional transient attacks of jaundice.

CASE 1.—The schoolboy, an only child, was examined 16 hours after death on Oct. 15th, 1937, in a public mortuary unequipped with cold storage. He had been a perfectly healthy boy until he had an attack of jaundice in December, 1936. No definite diagnosis had been made, and the condition cleared away in two weeks. He was then well until the day of his death. He had attended school in the morning, returned home for lunch shortly after 12 noon, had made no complaint of any kind, eating a good meal, and had gone back to school at about 1.30 P.M. for the afternoon session. At 4.30 P.M., a few minutes after leaving school, he was playing in the street when he suddenly complained of "feeling faint," and at once collapsed, apparently dead. A doctor who arrived but a few minutes later certified death and reported the facts to the coroner. The boy was said to have been "an average schoolboy," as active as his fellows without complaint, and taking part normally in games. He was neither "forward" nor "backward" in mental ability and had never given cause for any special attention.

Post-mortem examination.—Stature normal for age, but build slim. Height 4 ft. 7½ in. Pale, but without jaundice or other marks. No evidence of infantilism. No puberty changes. No abnormal distribution of fat. No abdominal protrusion when supine. Internally, the changes were confined to the heart and to the liver, except for evidence of terminal heart failure. Pericardial sac normal and without excess fluid. Heart very greatly enlarged, mainly in the wall of the left ventricle and interventricular septum. Weight 384 grammes (13½ oz.), that is, the weight of an adult heart on the verge of some hypertrophy. On section the most remarkable thickening of the wall of the left ventricle was found, greatest in the septum, which was 2·2–2·4 cm. in thickness (nearly 1 in.) and of pale yellow colour, soft, moist, and bulging slightly on the plane of section (Fig. 1). Similar changes were present to a lesser degree in the rest of the left ventricular wall: thickening was eccentric, the posterior wall being 1·2–1·4 cm. thick (½ in.) and the anterior wall 1·8–2·0 cm. thick (¾ in.). The wall of the right ventricle was very slightly thickened throughout, the muscle showing the same pale yellow discoloration. Both ventricles were slightly dilated. The consistency of their muscular walls was more like that of amyloid, in its firm unresilient feel and lack of mobility, than that of a simple but firm hyperplasia. The auricular musculature appeared normal, and the heart bore no other abnormalities of any kind. The coronary vasculature was, in dimensions, adapted to the increased size of the heart. The liver was not appreciably increased in size, but showed an increase of one-seventh in weight over the normal for the age. It was of normal outline, with sharp edges and of good colour; it was not in any sense yellowed or otherwise discoloured, and also had a normal consistency. Both kidneys were normal in appearance and showed no increase in weight. The spleen also was normal. All other organs and tissues, and the several endocrine organs in particular, appeared perfectly healthy.

Microscopical examination.—Material from the ventricular septum examined just over an hour later, fresh, and also after a further two hours alcohol or formalin fixation, bore the appearances of heart-muscle fibres of gargantuan dimensions, with imperfect transverse and longitudinal striations, due to a pale foaminess of the muscle shown by Best's staining method to be due to the presence of innumerable globular accumulations of glycogen (Fig. 2). The parenchyma of the liver showed similar changes, though much less marked. None was found in the kidneys.

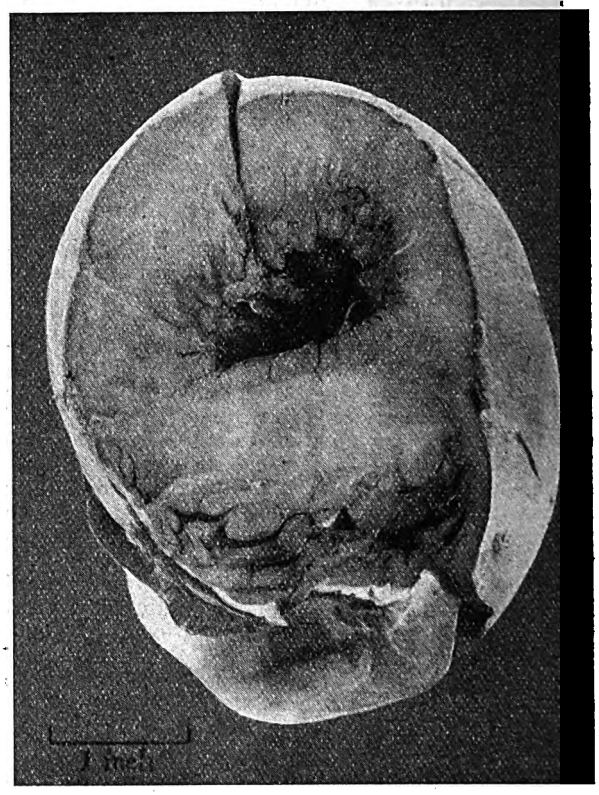

FIG. 1 (Case 1).—Heart, cut at the junction of middle and lower thirds of the ventricles and seen on the surface of section.

The Table of measurements of Case 1 shows the striking feature of this case of von Gierke's disease. As reflected by the comparative increase in weight, the disease has affected by far the most seriously the heart. The heart was more than three times its normal weight for the age, the liver being increased by no more than one-seventh and no other organ being affected. The Table also includes the measurements of weight taken in the second case.

—	Organ weights.							
	Heart.	Lungs.		Spleen.	Liver.	Kidneys.		Brain.
		Rt.	Lt.			Rt.	Lt.	
NORMAL—body-length, 135 cm. ..	122 g.	201 g.	190 g.	87 g.	909 g.	94 g.	95 g.	1320 g.
CASE 1 (aged 11) 139 cm. ..	384 g.	205 g.	210 g.	85 g.	1040 g.	92 g.	96 g.	1325 g.
NORMAL—body-weight, 11 lbs.	23 g.	35 g.	30 g.	½ oz.	5½ oz.	¾ oz.	¾ oz.	18 oz.
CASE 2 (3 mths.) 16 lb. ..	54 g.	40 g.	45 g.	½ oz.	6 oz.	1 oz.	1 oz.	21 oz.

Only heart and lungs retained for accurate weight in g. from Case 2. Other weights in this case recorded at P.M. in ounces. Average normal figures taken from Cappoletta and Wolbach's tables (1933).

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CASE 2.—An infant 3 months old was examined (E. G.) 33 hours after death on Feb. 6th, 1937, also without cold storage. He was perfectly healthy at birth, was breast-fed, and developed "wonderfully well." On Feb. 5th, 1937, the mother was worried because she thought he was breathing too fast, and called in a doctor. He found the breathing natural, the pulse and temperature normal, and he was apparently perfectly well. The father arrived home at 3 A.M. on Feb. 6th, and found the child, as he thought, dying. Death did, in fact, take place before the doctor arrived, which was almost immediately.

Post-mortem examination.—A healthy well-developed child of 16 lb., without marks or discoloration of any kind other than post-mortem lividity. A trace of yellow frothy fluid was present at the nose and mouth. No abdominal protrusion noted. No defects of skeletal development. Apart from terminal congestion of the brain and its covering meninges, of the lungs, with slight œdema, and of the liver and spleen—evidence in sum of terminal heart failure on both right and left sides—abnormalities were confined to the heart. Pericardial sac healthy and without excess of fluid. Heart weight 54 grammes as compared with 23 g. average normal weight at the age. All cavities were distended to the full with dark fluid blood, and the muscular wall of the left ventricle including the septum interventriculorum showed a remarkable thickening, with prominent columnæ carneæ and appreciable pallor of irregular distribution most marked in the upper parts. The endocardium was unusually pale and opaque. This thickening of the ventricular and septal wall was not regular, being appreciably greater in the septum; after fixation in formol saline (10 per cent.) the measurements of the walls varied from 0·8 to 1·3 cm. The foramen ovale was normal for the age, having a flap valve patency without functional deficiency of any kind. The ductus arteriosus was closed, and there was no stenosis of the main vessels. All valves

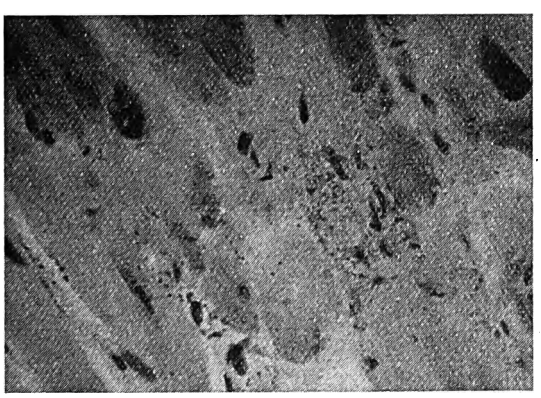

FIG. 2 (Case 1).—Section of muscle of interventricular septum showing coarse and fine intracellular granules of glycogen, the latter arranged with the cross striations. Stained with Best's carmine. (× 400.)

were normal. The interventricular septum was without defect. Examination of all other organs and tissues revealed no abnormalities other than terminal congestion. The endocrine organs in particular were normal for the age. It was remarked at the time that the coronary arterial supply to the heart had not developed pari passu with the increase in weight of the organ; that irrespective of the cause of the cardiomegaly the heart appeared to have outgrown its blood-supply.

Microscopical examination.—The examination of several parts of the affected heart muscle did not result in the demonstration of glycogen. Best's method was used, after fixation of approximately three days in formol saline (10 per cent.). Nevertheless the structural changes were identical with those already described in the first case. The muscle-fibres were of the same gargantuan dimensions, had the same imperfect transverse and longitudinal striations, and showed an identical "foaminess" of the protoplasm. It was felt at once that this cardiomegaly was of glycogenic origin, but that, already even, too much time had elapsed to enable a histochemical demonstration of the material to be made; that glycolysis had taken place. The condition had, at post-mortem, appeared to be so confined to the heart muscle that examinations of other tissues were not made.

According to Ellis and Payne (1936) in one of the most full descriptions of this disease, it is an essential character of the condition that there should be an abnormal stability of the glycogen, and whereas this is undoubtedly so, the knowledge should not lull one into any delay in making histo-chemical examinations of affected tissues, for fear of losing the sole basis of identification of the disease. It was found that microscopical examinations of the heart muscle from the proven case of the disease taken from periods of 2 days onwards provided increasing difficulty in the recognition of glycogen; the characteristic foaminess of the protoplasm remained, but its affinity for Best's carmine decreased rapidly until on the fourth day it no longer became possible to demonstrate this material. It is precisely because of this observation that the second case was held to be one of von Gierke's disease in spite of the fact that no glycogen was demonstrated.

DISCUSSION

Several examples of cardiomegaly, occurring in the disease, have previously been described—in particular, with histological descriptions, by Pompe (1933), and by Unshelm (1934), but there has as yet been no description of the disease from a medico-legal standpoint as a cause of sudden death.

In neither of the present cases was there any clinical evidence of serious disease; the schoolboy had had an attack of jaundice not uncommon to the condition, and in all probability a form of true catarrhal jaundice, but had recovered what was apparently a condition of perfectly good health for at least nine months before his death. Neither child showed any retardation of growth, and this is the more remarkable because this retardation is now regarded as more probably due to a profound dysfunction of any one organ than to an endocrine disorder. There has been no shred of proof as yet that it is an endocrine disease. It might be thought, in two cases such as these where the organ most profoundly affected was the heart itself, that growth would have been most likely to have been retarded were this a proper explanation of its occurrence.

In each case there was no doubt whatever about the cause of death; the heart muscle alone was seriously diseased. Failure in each case was quite sudden and unexpected, and it is to record this type of case, with its medico-legal significance, that we add to the small amount of published work on the disease.

We are indebted to Dr. P. B. Skeels, coroner for metropolitan Essex, and Mr. G. Wills Taylor, coroner for West Surrey, for permission to use the facts relating to these two cases.

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THE CLASSIFICATION OF THE PNEUMONIAS

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Osler (1906) defined lobar pneumonia as an infection characterised by inflammation of the lungs, toxæmia of varying intensity, and a fever that usually terminates by crisis. It is included in the section dealing with acute specific diseases, whereas broncho-pneumonia is described in the section of diseases of the lungs and is defined as an inflammation of the terminal bronchus and the air vesicles which make up the pulmonary lobule. Davidson (1935) considers it wrong to classify lobar pneumonia with the infectious diseases and broncho-pneumonia with diseases of the lung. He points out that in broncho-pneumonia the inflammation is not confined to the lobule and that the word "broncho" is superfluous because the bronchi are involved in all forms of pneumonia.

In hospital practice one cannot help being struck by the comparative rarity of pneumonia starting suddenly and ending by crisis and the frequency of some acute or subacute pulmonary infection the course of which does not conform to text-book type of either lobar or broncho-pneumonia.

Now some of these cases are simple bronchitis in which the smaller bronchi and certainly the alveoli escape, but in an appreciable number the lung tissue is involved and if by pneumonia one means inflammation of the lung then these cases must be regarded as pneumonia.

ACUTE PNEUMONIA

The so-called typical pneumonia which begins suddenly and ends by crisis may be compared with the rare form of acute tuberculosis known as pneumonic phthisis. In this condition an area, and sometimes a large area, of the lung suddenly becomes solid, the alveoli become filled with leucocytes and exudate and although resolution, if it occurs at all, is by lysis the onset of the disease can rarely be distinguished from ordinary lobar pneumonia. It has been suggested that pneumonic phthisis is an allergic reaction around a tuberculous focus in the lung and certainly similar focal reactions have been produced by the injudicious use of tuberculin.

These tuberculous pneumonias may be extensive and rapidly fatal but they vary in severity and some are mild with few symptoms and ending with complete resolution. Sometimes the inflammatory zone resolves but leaves a core of active tuberculosis which may spread locally and cause the ordinary form of caseous or fibrocaseous tuberculosis or which may itself heal leaving only a fibroid or calcareous scar. Is it not possible that the ordinary lobar pneumonia is an allergic reaction comparable to the tuberculous form? In both cases the condition varies in severity from one of extreme toxæmia to one in which the patient shows no symptoms of toxæmia at all.

BRONCHOGENIC PNEUMONIA

The so-called broncho-pneumonia is different not because there is associated bronchitis, which is invariably present also with lobar pneumonia, but because the infection spreads through the bronchi. Thus in tuberculous cases broncho-pneumonia often results from hæmoptysis, the blood carrying the infection through the bronchial tubes. In cases of tuberculous cavities it is sometimes possible to trace the bronchogenic spread of the infection and a terminal tuberculous broncho-pneumonia is a common cause of death. After thoracoplasty the risk of a broncho-pneumonia is much reduced even if the cavities are not closed, because, as Jacobaeus (1936) has shown, the effect of the operation is to prevent cough from affecting the treated lung, so that sputum cannot be dispelled. In non-tuberculous cases spread takes place through the bronchial tubes in the same way, thus it may follow spread of bronchitis to the smaller tubes as may often be seen in cases of influenza or measles. It may follow aspiration of foreign bodies into the bronchi, an uncommon but well-known cause being vomiting during anæsthesia when the vomit enters the bronchial tubes.

SECONDARY PNEUMONIA

Although classical cases of lobar or broncho-pneumonia occur it is far more common in practice to find one of the atypical types some of which are now known as pneumonitis, although this word has the same meaning as pneumonia—namely, an inflammatory condition in the lung.

It is common for a patient, usually a child but sometimes an adult, to come to the out-patient department of a hospital with a temperature of 103° or 104° F., with cough, pain, and a shower of moist sounds audible at the base of one lung, and yet twenty-four hours after admission the temperature has become normal and except for a little cough and possibly a few crepitations the patient has recovered. In many of these cases I think the cause is a plug of mucus producing an area of collapse with an inflammatory reaction, and what is this if not pneumonia? When the mucus is dislodged the lung is aerated and the inflammation quickly subsides. The same result follows when the sudden blocking of a bronchus by carcinoma leads to inflammatory or pneumonic reaction around the collapsed area. Later when the growth ulcerates and opens up the bronchus the acute condition subsides and the patient appears better. I have frequently seen cases of carcinoma of lung in which the first manifestation was an acute illness called, and rightly called, pneumonia.

An area of inflammation of the surrounding lung tissue (pneumonia or pneumonitis) may result from the breaking down of a tumour, or from an abscess or embolus. It may occur in connexion with bronchiectasis, actinomycosis, or other gross disease of the bronchi or lungs. The point of clinical importance is that these atypical or secondary pneumonias may lead to the same serious complications which sometimes follow the so-called lobar or broncho-pneumonias. Of these empyema and abscess of lung are the most important. It is true, however, that apart from these complications the patient rarely suffers from much toxæmia, the illness is not severe, and recovery is the rule. The condition is often long drawn out so that many weeks or even months may occur before recovery is complete.

SUBACUTE AND CHRONIC PNEUMONIA

Scadding (1936, 1937) has described a chronic form of pneumonia, often ending fatally, in which fibrosis occurs during the course of the illness as in tuberculosis. In his cases, however, autopsy showed that the condition was non-tuberculous, although during life the radiological findings closely resembled the mottling of tuberculosis. The actual condition was a simple pneumonia in various stages of evolution, early consolidation, resolving consolidation, organisa-

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tion, and suppuration leading to small abscesses. It would appear that in this type of pneumonia resolution might occur at any stage and either be complete or leave a varying amount of fibrosis. Cases of this type in which resolution occurs within a few weeks may be called subacute, and Scadding has described them under the title of disseminated focal pneumonia. The origin of these chronic pneumonias is unknown, but they may occur when the virulence of the infecting organisms and the resistance of the patient are such that the one is insufficient to produce an acute pneumonia and the other insufficient completely to overcome the infection.

The bacteriology of the condition is important both in the acute and chronic case, but it is well known that in every series of cases due to any given organism there are mild, medium, and severe cases. It is not denied that prognosis and the course of the disease do depend to a large extent on the organism which causes the pneumonia, be it the tubercle bacillus, streptococcus, staphylococcus, and if the pneumococcus on the particular type. At the same time every case of tuberculous pneumonia does not run the same course or end in the same way and this applies equally to pneumonias caused by any other organism. All types, however, have in common the danger of the same complications, the most serious of which are empyema and abscess.

ILLUSTRATIVE CASES

The following cases illustrate pneumonia secondary (1) to embolus, (2) to blocked bronchus, (3) to extension from a growth, (4) to thrombosis, and (5) a subacute pneumonia.

(1) *Pneumonia secondary to embolus.*—(*a*) A woman of 26 developed slight pain in the left side of the chest a fortnight after childbirth. She had no cough or other symptom and the pain lasted less than 36 hours. Two days later she gradually began to become febrile and a few crepitations were heard over the base of the left lung where she had had the pain. Later this developed into signs of consolidation, she began to cough, and spat up rusty sputum. After ten days the temperature began to fall but never really became settled and usually rose to 99° F. in the evening. About four weeks after the onset of the illness an effusion was diagnosed; a sample showed it to be thin, cloudy liquid, this was aspirated but eventually became thick pus. Drainage was performed but eventually she died.

(*b*) Eight days after an operation for hernia a man of 60 had pain on the right side of the chest and the temperature began to rise. At first there were no signs in the chest, but a fortnight later some dullness was found and 16 oz. of cloudy fluid were aspirated from the right base. The cells present were mostly polymorphonuclear and the fluid was sterile. He became extremely ill, with heavy sweating and rapid wasting; the evening temperature was 102° F. There was a considerable amount of sputum but no tubercle bacilli were found. Some days later the percussion note on the left side was dull and a sample of fluid was taken from this side and was clear. Another sample from the right side at that time was more cloudy and on standing over night the test-tube showed about one-tenth pus. It was thought that an empyema would develop and require operation, but the patient made a steady though slow recovery.

(2) *Pneumonia secondary to blocked bronchus.*—The patient had pulmonary tuberculosis with radiological evidence of a cavity in the lower zone of the left lung. A pneumothorax was induced and it was decided to try and block the bronchus leading to the cavity by the method described by Brooks (1938). A balloon was introduced into the bronchus and dilated and the corresponding part of the lung collapsed. The next day the patient had a temperature which persisted for a few days and then settled. This febrile reaction was considered due to a local area of inflammation which quickly settled and left the lung collapsed. It is uncommon in these cases for this pneumonic reaction to take place, but is frequently seen when a bronchus suddenly becomes collapsed by carcinoma.

(3) *Pneumonia secondary to extension from a growth.* A man of 55 developed a cough and signs of bronchitis at the end of October. He kept on at work for three weeks when he consulted his doctor. He was found to have signs of congestion at the base of the right lung and a temperature of 101° F. Radiography showed an opacity over this area. The temperature persisted for a fortnight then gradually fell but later rose to 100°–101° and signs of fluid at the right base were found. On Dec. 6th a sample of cloudy fluid was removed from the right pleural cavity and on examination it was found to contain *Streptococcus hæmolyticus*. It was decided to aspirate until the fluid became frank pus and then drain. After the second aspiration, however, no fluid was found and a pleural rub could be heard. He became increasingly ill and subsequent radiography showed evidence of a growth spreading in the lung tissue and he eventually died from carcinoma.

(4) *Pneumonia secondary to thrombosis.*—On Jan. 25th, 1934, a man of 37 coughed up a little blood. This continued and so on Jan. 30th a radiogram of the chest was taken but it showed nothing wrong with the heart or lungs. On physical examination a few fine crepitations were heard at the left base, but no other signs were found in the chest, throat, or larynx. He complained of slight pain in the left axilla, but otherwise felt well and the temperature was normal. On Feb. 5th he had a sudden pain over the base of the right lung and the temperature rose to 101° F. He coughed up small clots of bright blood. There was now dullness at the right base and many coarse crepitations were heard on auscultation. A radiogram taken on the next day showed a dense opacity at the right base suggesting collapsed lung. It was thought that the original hæmoptysis was due to carcinoma of lung and that the acute pain and collapse of lung resulted from sudden blocking of a bronchus. Radiography after lipiodol, however, showed no blocked bronchus and no signs of growth were seen on bronchoscopy. The temperature persisted for a fortnight then gradually fell to normal and the physical signs also gradually cleared. A radiogram taken on April 11th, 1934, showed that the opacity at the right base had completely disappeared and nothing abnormal was seen. On Feb. 28th, just as the signs in the chest were clearing and the temperature had reached normal, he developed a right femoral thrombosis. The possibility that the case was one of thrombo-phlebitis migrans was now considered. This would account for the original hæmoptysis without radiographic signs, for the sudden pain on the opposite side, the hæmoptysis and subsequent pneumonic area, and finally for the femoral thrombosis.

(5) *Subacute pneumonia.*—A man of 31 began to run a slight evening temperature whilst on a holiday abroad. On his return on August 4th he saw his doctor who found no physical signs but the temperature was 101° F., pulse 76, tongue dry and coated. A slight cough developed and sputum in which tubercle bacilli were not found. He looked toxic and ill. Typhoid was suspected but tests for typhoid, paratyphoid, and abortus fevers were negative. In the third week the temperature fell, the tongue cleared, and he felt much better, but a week later the temperature again rose for four days and then once more became normal. A few days later, however, he developed pain in the left side of the chest and a pleural rub was heard. This was the first physical sign that had been discovered. On Sept. 21st his general condition was good and he said he felt well in himself but had a slight ache on the left side. On examination medium crepitations and broncho-vesicular breath sounds were heard at the base of the left mid-zone. A radiogram taken at this time

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showed a diffuse area of opacity in the left mid-zone extending from the root to the periphery. The temperature was swinging between 101° and 99° F. The pulse was 76–86. The whole of the right basal zone showed diminished translucency suggesting an area of consolidation almost resolved. The temperature gradually settled, was normal by Oct. 12th, and he made an uninterrupted recovery.

SUMMARY AND CONCLUSION

These few cases have been chosen to illustrate the inflammatory condition of the lung which so frequently occurs apart from the so-called lobar or broncho-pneumonia. Cases of chronic pneumonia have been described by Scadding. I think all these cases should be grouped as pneumonia and it seems unnecessary to introduce the word pneumonitis unless all cases are called pneumonitis and the word pneumonia is dropped.

I should suggest the following classification:—

1. Acute pneumonia—the text-book lobar pneumonia which it is suggested may be an allergic condition.
2. Bronchogenic pneumonia in which the inflammation spreads by the bronchi.
3. Secondary pneumonia.
4. Subacute or chronic pneumonia.

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THROMBOSIS OF CENTRAL VEIN OF RETINA TREATED WITH HEPARIN*

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RECENTLY pure heparin was made available. As could be expected from earlier literature it proved non-toxic and could be applied for clinical experiments. Several attempts have been made to prevent venous thrombosis with injections of heparin. To our knowledge the following case is the first one in which heparin has been used for the treatment of an already developed thrombosis in man.

Hedenius and Wilander (1936), in a preliminary paper, showed the non-toxicity of pure heparin, even if given in repeated doses intravenously in man, and Hedenius (1936, 1937) has suggested giving heparin to the donor in blood transfusions. The lack of toxicity is clearly demonstrated in the subject of the present article in which a patient has been submitted to a prolonged treatment of over a week. Crafoord (1937) used this preparation post-operatively in a series of cases to prevent thrombosis. He found that the amount of heparin necessary to produce a certain prolongation of the coagulation time before operation must be considerably increased in the 24 hours after an operation. This indicates that there is an excess of thrombokinase in the blood shortly after operation, which can be counteracted by means of heparin. The Toronto workers, Murray, Jaques, Perrett, and Best (1937), prove the usefulness of heparin experimentally in animals. The tendency to the formation of thrombi in injured blood-vessels was found to be strongly decreased during treatment with heparin. They have also applied their findings clinically by recommending heparin treatment particularly in connexion with operations on blood-vessels.

From the recent findings of Jorpes, Holmgren, and Wilander (1937) that heparin is produced in the mast cells of Ehrlich, which are mainly localised to the walls and the neighbourhood of the blood-vessels, it is evident that heparin assists in keeping the blood fluid. Therefore treatment with heparin seems to be indicated in many cases, where there is an undesirable tendency to the formation of fibrin—e.g., in order to counteract the growth of thrombi in veins and arteries, and to prevent the formation of adhesions of the serous membranes or the organisation of hæmorrhages in the vitreous body of the eye. It is thus evident that a new field of research has been opened, in which valuable results may be expected within many branches of practical medicine. In the following case we were able to watch the gradual return of vision in an eye with a thrombosis of the central vein of the retina, after treatment with heparin.

CASE REPORT

A hospital nurse, aged 52, apparently in the best of health, became aware of a sudden dimness of her right eye at about 5 P.M. on Sept. 30th, 1937. At the time she was out cycling, but was not at all exhausted. When she resumed her work at the hospital the following day the presence of a venous stasis and hæmorrhages in the right retina was established.

On examination.—Temperature normal. Sedimentation-rate 11 mm. per hour. Heart: no subjective or objective signs of disease; blood pressure 120/65 mm. Hg. Urine normal; no other venous thromboses. She had suffered from slight nasal catarrh and "grinding" headaches on the left side (not on the right), but an examination of the nose disclosed nothing indicating an affection of the accessory cavities. (The white-cell blood picture was normal on Oct. 7th). On the same day (Oct. 1st) at 6 P.M., 25 hours after the symptoms appearing, the local condition was as follows (K. G. P.). Right eye: external parts normal; pupil round, the same size as the left one; normal reaction; papilla somewhat œdematous and hyperæmic, veins dilated, arteries narrow; a small number of slight hæmorrhages in the vicinity of the papilla and in the macula, and scattered, small, round or irregular, intensely red hæmorrhages, mostly along the vessels far into the periphery; tension 13 mm. Hg; vision barely 0·2. Left eye quite normal; tension 13; vision = 1 (emmetropia).

On the basis of the diagnosis thrombus in the main trunk of the right central vein and the consequent very doubtful prognosis, which will be further discussed below, the following treatment was given (N. H.): (1) The patient was sent to bed. (2) Prontosil was given. This would be effective only if the thrombosis was due to a bacterial infection which, however, could not be determined—consequently its effect cannot be estimated. (3) Heparin was injected for the reasons discussed above.

Treatment.—The patient was given intravenous injections of heparin. We used a 5 per cent. solution of standard potency (Jorpes and others 1937) supplied by Vitrum of Stockholm. The first injection was given on Oct. 2nd at 10 A.M., 41 hours after the appearance of the symptoms. The dose was repeated after 4 hours, but after another 4 hours it was increased to 1·66 mg. per kilogramme, and was then repeated every fourth hour, except during sleep. She also had 5 c.cm. of prontosil a day. On the 4th and 5th all medication was discontinued, only because there was a certain hesitation as regards the

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risks. When, however, on the 5th there was an improvement of vision (from 0·2 to 0·4) we started anew, the treatment being finally concluded on Oct. 13th. We gave prontosil in 3 doses daily, of 2 tablets each until Oct. 8th and then 1 tablet.

Thus 3–4 daily doses of heparin of 1·66 mg. per kg. body-weight were given during a period of about 10 days without any perceptible inconveniences. *Progress* of the eye symptoms was as follows (K. G. P.): Oct. 5th: Pupil as before, papillary swelling increased, and the stasis more pronounced, showing more dilated veins and very narrow arteries. Hæmorrhages around the papilla increased, two large ones being seen above and to the nasal side. Tension, on palpation, normal. Vision 0·4–0·5. (Oct. 7th = 0·7 : 9th = 0·9 (N. H.).)

Oct. 13th: Papillary œdema apparently decreased. Hæmorrhages near papilla the same, in the macula visible only with difficulty, and in the periphery decidedly less clearly pronounced than earlier. Vision 0·8–0·9 (without glasses).

20th: Papillary œdema very slight. Papilla margins visible everywhere except upwards. Veins less dilated, arteries more visible. In the macula traces of small hæmorrhages, but few seen in the periphery. Field of vision normal. Vision 0·8–0·9; with glasses (−0·25) = 0·9.

27th: Papilla considerably clearer and better delimited. Veins still somewhat dilated. The large parapapillary hæmorrhages thinner, the macula being free and only a few solitary ones visible in the periphery. Vision 0·9 (with −0·50 glasses).

Nov. 3rd: Pupil normal. Papilla shows very slight changes. Resorption progressing rapidly; in the periphery it is possible only when making a very minute examination to see a few very slight remains of hæmorrhages. Close to the papilla, they are considerably thinner than before. Tension of both eyes 17 mm. Hg (Schiötz). Vision 0·9 (−0·50). Subjectively there is only a slight dimness of the right eye.

10th: Subjectively without symptoms. Delimitation of papilla only slightly indistinct. Veins somewhat dilated. Parapapillary hæmorrhages still visible, though reduced in size, paler, and thinner. Otherwise no hæmorrhages anywhere in the fundus. Vision 0·9 (−0·50).

Jan. 5th, 1937: Vision 1·0 (−0·50).

DISCUSSION

It is hardly necessary to discuss the diagnosis, thrombus in the main trunk of the central vein of the patient. The sudden decrease in vision indicates a circulatory disturbance and the ophthalmoscopic finding is characteristic. Stasis phenomena—i.e., papillary œdema, dilated veins, constricted arteries, and hæmorrhages—occur also in cases of choked disc and papillitis, but the symptoms do not appear suddenly in those, and furthermore the hæmorrhages are confined to the posterior part of the fundus. Hæmorrhages in the periphery, occurring at the very beginning of the disease, may be considered characteristic of venous thrombus. The obstruction to the blood flow cannot have been complete, as the symptoms would then have been more serious.

One of us (K. G. P.) had a rather discouraging experience of circulatory obstructions in the main trunk of the central vein, which led us to form an unfavourable prognosis. The fact is that symptoms, inconsiderable in the beginning, are very often found to be aggravated in the course of a few days, the papillary swelling, venous stasis, and hæmorrhages increase, and the vision decreases simultaneously. Probably clots accumulate on the thrombus, thus still more impeding the blood flow, so that the obstruction becomes more complete. The danger of an increased tension is then very great, and the eye frequently becomes blind; if pain ensues, enucleation may be found necessary.

Of the 78 cases of thrombosis of the vena centralis on our records, the majority are branch thrombi, of no interest in this connexion. One of us (K. G. P.) has had the opportunity of studying a total of 13 cases of thrombus in the main trunk; 9 of them became blind, 8 on account of increased tension, 1 due to proliferating retinitis and retinal detachment; 5 of these blind eyes were enucleated, possibly more, as it was not possible to follow the other three cases. Out of the remaining 4 cases, without increased tension, the vision of one is 0·3, of two 0·1, and of the fourth temporal hand movements—i.e., practically blindness.

It may be argued that our prognosis was too unfavourable and that the disease might have pursued a comparatively innocent course even without any treatment whatever. Experience proves, however, that even an incomplete obstruction of the main trunk of the vena centralis will practically always result in a permanent, more or less pronounced, decrease in vision. Recovery will, even in the most favourable cases, require a long time, six months or more. It must be unique to witness the disappearance of hæmorrhages and the increase of vision to its normal value in so short a time as 5–6 weeks.

Our treatment was based on the following reasoning. In the main trunk of the right vena centralis or possibly in its continuation a thrombus is formed, possibly increasing through the accumulation of fibrin or thrombocytes, until the obstruction at last becomes so considerable that venous stasis, ischæmia, and hæmorrhages appear, followed by a decrease in vision. By continual effect of heparin—known to be an anticoagulating principle of the blood—the growth of the thrombus will be counteracted. Any fibrin present may be expected to retract, and consequently the obstruction to the circulation will be reduced or the dilated veins will more easily admit a flow of blood past the thrombus.

Considering the comparatively rapid disappearance of the heparin from the blood, only a small part being traceable in the urine, as well as the fact—according to Jorpes and others (1937)—that its rapid destruction in the tissues is not very likely, we may perhaps presume a diffusion through the capillary walls out into the tissues, the latter then being heparinised. It does not appear unreasonable to suppose that the blood of the hæmorrhages then remains more liquid and may be resorbed more easily. In the present case most of the hæmorrhages remained the same colour, until they were resorbed with most unusual rapidity.

One can hardly be mistaken in ascribing the unusually favourable course of this case to the heparin treatment. Consequently it is interesting to look forward to the effects that may be produced in all the greatly varying processes where it may be of importance to be able to prevent the precipitation of fibrin in blood, in the other body fluids and tissues, or on serous membranes, &c. It seems to be established above that venous thrombosis of various kinds first and foremost comes under this category.

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THROMBOSIS OF THE POSTERIOR-INFERIOR CEREBELLAR ARTERY (WALLENBERG SYNDROME) TREATED WITH HEPARIN

BY J. HENNING MAGNUSSON, M.D.

(From the Department of Medicine, Maria Hospital, Stockholm)

HEPARIN, the body's own anti-coagulant, now being available in a pure form, its use in medicine is of current interest. It was discovered by Howell (1916) and thanks to his works it was made generally known. Charles and Scott of Toronto (1933) worked out a preparation method of practical value, and Jorpes of Stockholm (1935) discovered its chemical nature, so that the substance has now been obtained in a pure form.

It is evident from the work of Crafoord (1937) and Murray and Best (1938) that fairly large doses of the pure heparin may be repeated intravenously without causing any definite inconvenience, and that it is possible in this manner to endeavour to prevent the formation of thrombosis or to check the growth of fresh thrombi already formed. The case reported above by Holmin and Ploman is an experiment in that direction, and owing to the position of the thrombus the course could be followed in a satisfactory manner. The case of Wallenberg's syndrome described below, in which a thrombosis of the posterior-inferior cerebellar artery produces the symptoms, was considered suitable for such treatment.

CASE REPORT

A married woman, 48 years of age. Healthy in childhood and adolescence except for some slight infections of the air-passages. Operated on in 1916 for appendicitis and salpingitis. Thenceforward healthy until early in 1935 when diabetes mellitus became established. Since then has received regular ambulatory treatment for her diabetes (dietetic treatment without insulin), which was of a mild character. Never suffered from any kind of arthritis.

In the night of Sept. 12th, 1937, patient woke, having been quite well the day before, with a throbbing head and a headache localised to the left side of the back of the head. She continued to do her daily work but was troubled by diplopia and a feeling that she was being pulled over towards the left. After about three weeks the symptoms ceased to trouble her. On Nov. 21st, 1937, she began to feel unwell, recovered temporarily and did her housework for two days, but on Nov. 24th woke at 4 A.M. with a bad headache and vertigo. The right half of her face was in a cold perspiration, the left half stiff and anæsthetic. In the morning the patient noticed a tendency to fall to the left. Temperature 98·8° F. She became worse, finding it difficult to swallow or to speak. The next day she vomited several times, with increased dizziness and vertigo, intense headache, inability to swallow or to speak clearly but with full understanding of what was said around her. She was admitted to hospital on Nov. 25th when, on examination, she looked "apoplectic," and her reactions were retarded and dull. Temperature and heart normal. SR 9 mm./hr. Blood pressure 180/90 mm. Hg. Urine tests: Almén +, Legal pos., Heller neg. Blood-sugar 180 mg. per 100 c.cm.

On neurological examination the *somatic motor component* showed a marked hemi-asynergia and hemi-ataxia of the left side. Every movement of the upper as well as the lower extremity on that side was carried out with very great uncertainty and displayed a distinct lack of coöperation of the synergic units of the left arm and leg. The patient tended to fall to the left, and her equilibrium was strongly affected. Her eyes were closed the whole time owing to diplopia caused by abducens paresis on the left side; when looking upwards she displayed a strong rotatory nystagmus. There was no atrophy of the tongue, and its movements were symmetrical. No fibrillar twitchings, no pareses or abnormal muscular or skin reflexes. Babinski and Rossolimo negative. Pupillary reactions and ocular fundi normal.

The *somatic sensory component* showed a loss of all sensibility on the left side of the face and head, up to the interauricular line and as far as the sagittal line in front, and affecting also the cavities of the nose and mouth on the left side. On the right side of the body, up to the interauricular line, there was a decrease in sensibility to pain and temperature, but not to touch. Smell, vision, and hearing were normal. Vomiting and vertigo continued, and since the slightest movement of the head intensified the latter the patient tried to lie motionless.

The *splanchnic motor component* showed a paralysis of the left half of the soft palate and of the left vocal cord. All food, solid or liquid, was regurgitated. Great difficulties were experienced in passing even a small duodenal tube for feeding purposes.

The *splanchnic sensory component* was normal.

Dr. Ragnar Bringel, called in on Nov. 26th, diagnosed the condition as a typical and fully developed case of Wallenberg's syndrome—i.e., a thrombosis of the left posterior-inferior cerebellar artery, with a lesion of the circumferential and intermediate zones of the medulla oblongata. The possibility of treatment by heparin was discussed and on Nov. 28th it was begun, since the symptoms had become more severe and feeding presented increasing difficulties.

TREATMENT

The patient was given intravenous injections of a 5 per cent. solution of standard heparin (Bergström, Jorpes, and Wilander 1937) obtained from Vitrum in Stockholm. The first injection, 150 mg., was made on Nov. 28th at 11 A.M. Some minutes after the injection the patient heard "murmurs," felt intense heat in the left part of the head, and some ill-defined general sensations, these symptoms lasting about half an hour. In the afternoon of the same day the patient was given another injection of heparin, 150 mg. No reaction followed this or subsequent injections of the same dose given t.d.s. for five days.

One incident is worthy of mention. On Nov. 29th, shortly after an injection, the mucous membrane of the throat was accidentally injured by the passage of the duodenal tube, causing bleeding. In the circumstances it was feared that the bleeding would be profuse; but actually the bleeding stopped after a few minutes and was never more copious than would have been expected in a normal patient. This observation led us to determine the capillary bleeding time in seven cases, using the ordinary method, 15–20 minutes before and after intravenous injections of heparin (150–250 mg.), and we have also carried out hæmoglobin estimations and red, white, differential, and platelet counts. No change could be demonstrated after the injections either in the bleeding time or in the blood. The fact that it was impossible to demonstrate any prolongation of capillary bleeding after the injections indicates, in my view, that the danger of any bleeding occurring soon after the injections is less than might be expected.

The course of the neurological symptoms was as follows:—

Nov. 29th (after 4 heparin injections): Mentally patient more lively. Able to put left heel to knee,

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previously impossible. Aphonia less pronounced. Otherwise no change.

30th (after 7 heparin injections): Mentally condition about the same, but patient feels decidedly better after first calm night with good sleep since illness started. Ataxia of left arm decidedly decreased, and finger to nose test carried out fairly accurately. Aphonia definitely less pronounced.

Dec. 1st (after 10 injections): Mentally decidedly brighter, the headache and vertigo diminished. Patient can now move and turn in bed and lift her head without difficulty. The heel to knee and the finger to nose tests carried out perfectly. Aphonia practically absent. Paresis of the soft palate definitely decreased. Uvula still slightly drawn to the right. Cramp in the upper circular muscle of the œsophagus less pronounced. Patient can hold a glass of water in her left hand and drink from it without mishap. Cannot swallow solid food.

2nd: Progressive improvement. Patient eating bread and butter, though with some difficulty.

3rd: Patient bright, eats solid food without difficulty, sits up in bed without support, moves head easily. Nystagmus hardly noticeable, diplopia less pronounced.

6th: Patient sits up spontaneously, and can sit with her eyes closed without falling.

10th: Anæsthesia seems less; some sensitiveness to pain stimuli on the right side of thorax and upper arm, and a very little to heat and cold.

The patient's condition continued to improve steadily though slowly. Two months after being taken ill she could walk up and down the hospital passage, with support, and diplopia was no longer present. In another month she could just walk up and down the passage without support. Romberg's test (aggravated) negative. The paræsthesia remained but was less pronounced than formerly. Sensitivity to pain and heat and cold appeared to be normal only in the right half of the chest and abdomen and in the right upper arm.

DISCUSSION

It is hardly necessary to discuss the diagnosis in this case, all signs pointing to thrombosis of the left posterior-inferior cerebellar artery. The apoplectic beginning gave a decided indication of a lesion of a vascular origin. The clinical picture, especially the neurological changes, agreed in every detail with those of the Wallenberg syndrome. Since Wallenberg (1895, 1901) gave a detailed description of these symptoms, numerous cases of this kind have been reported. The essential clinical symptoms are: ipsilateral lateropulsion, hemi-asynergia, and hemiataxia; ipsilateral hemifacial anæsthesia, including all types of sensibility; contralateral loss of pain and temperature sensibility in the arm, trunk, leg, neck, and skin over the scalp up to the interauricular line; ipsilateral paralysis of the vocal cord and soft palate; the absence of all other motor and sensory symptoms. Sometimes the patient's illness at the onset shows remissions. Thus, for instance, a slight lateropulsion may come and go, the patient becoming definitely ill only at a later stage. The onset is usually apoplectic in character. The difficulties of swallowing if not very pronounced tend to decrease after some weeks. Generally the disturbance of equilibrium does not definitely keep the patient in bed, the ability to walk and stand straight usually returning, though seldom completely. Tilney and Riley (1928), giving an account of the Wallenberg syndrome, illustrate it by describing a case in which the patient made a complete recovery. They say of the duration of the initial stage in their case, evidently a slight one: "He remained in this critical condition for a number of weeks, during which time it was necessary to feed him by tube because of his marked dysphagia."

The case described in this paper must be considered a severe one. Considering the prognos quo ad durationem indicated by experience, it is striking how rapid was the improvement after the heparin treatment. The possibility that the effect was due to suggestion is excluded by the mental condition of the patient.

I am greatly indebted to Dr. Ragnar Bringel for assistance with the neurological part of this work.

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Clinical and Laboratory Notes

A NOTE ON THE DETERMINATION OF BLOOD ASCORBIC ACID

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In the determination of ascorbic acid in plasma as described by Farmer and Abt (1935, 1936) and later modified by Pijoan and Klemperer (1937) the deproteinised fluid is titrated in a 50 ml. beaker with 2 : 6 dichlorophenol-indophenol to a pink end-point, using illumination with a daylight filter.

Rapid titration to a pink colour varies so much with the individual observer that some more definite end-point seemed to be desirable. After a series of experiments to produce a suitable colour with which to compare the unknown titration, I found the standard colour described below to be the most suitable. When this colour match was used the rate of titration was increased and, in addition, a more accurate method of estimation was provided.

For the standard colour, the following two solutions are required: Solution A (0·5 millilitre) is added to solution B (0·5 millilitre) and the mixture is diluted to 35 millilitres with freshly boiled and cooled distilled water.

Solution A: This is a solution of methyl-red in alcohol and is prepared as follows: methyl-red, 0·002 g.; N/20 NaOH, 0·76 ml.; 90 per cent. alcohol, 4·0 ml. Dissolve in warm water bath and dilute with 20 per cent. alcohol to 200·0 ml.

Solution B: This is a buffer solution, the composition of which is M/5 potassium chloride, 50·0 ml.; N/5 hydrochloric acid, 2·62 ml.; distilled water freshly boiled and cooled to 200·0 ml.

It was found that the standard colour remained stable for at least one week when kept in a stoppered pyrex tube exposed to light at room temperature. But to eliminate any possible variation due to alkalinity of the glass container, it is recommended that the standard be prepared daily.

Comparison is made in pyrex tubes of 10 cm. length, 1·5 cm. external diameter, and 1·3 cm. internal diameter. The tubes are set at an angle of 55°.

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The standard colour is delivered from a burette so that the volume of solution in the standard tube is equal to that in the unknown.

SUMMARY

The preparation of a standard colour is described, the use of which provides a more accurate and rapid method of estimating blood ascorbic acid by the method of Pijoan and Klemperer.

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EPIPHYSITIS OF THE CARPAL PHALANX

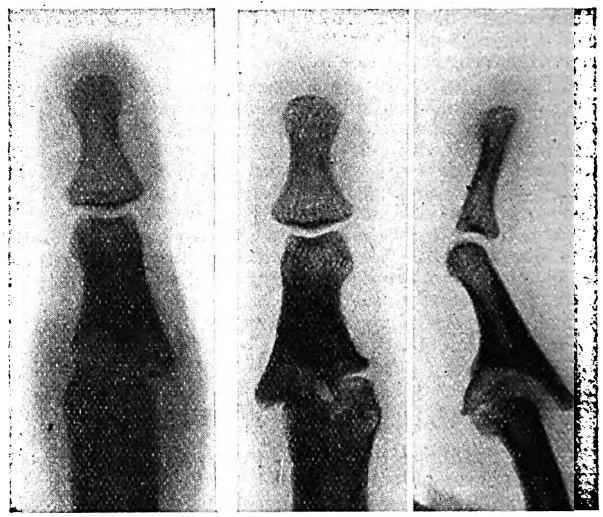
By A. H. Bizarro, F.R.C.S. Eng.

A student aged 18 consulted me for a stunted left ring-finger, five years after a fall on the closed fist. He was at that time suffering from colitis and diarrhœa. The ring-finger became at once swollen and stiff, but with little pain or tenderness. Artificial light treatment and calcium injections were prescribed at the time; no immobilisation was advised. His family history was normal.

When I saw him he was a strong-looking lad. His left ring-finger was short and bulbous. The skin as normal. As there was complete range of painless motion he was advised to do nothing to it. A recent radiogram shows destruction of the base of the middle phalanx of the ring-finger (see Figure); in a lateral view it looks like a cap over the head of the proximal phalanx. A similar appearance is seen in a radiogram taken 18 months after the onset of the condition.

The broadening of the base of the middle phalanx, the thickness of the primiphalanx shaft, the shortening of the metacarpal, the evolution of the disease all point to a clinical picture similar to that in the metatarsal head, which Freiburg (1914) called infraction, and Köhler (1923) as some epiphyseal disturbance—osteochrondritis.

In this particular case there was a definite injury,



A B

The affected joint (A) 18 months after onset; (B) 5 years after onset (anterior and lateral views).

yet at first sight it looked like a healed tuberculous spina ventosa. The main features of interest are:—

(1) Phalangeal osteolysis is a rare condition.

(2) Its similarity with tuberculous dactylitis.

(3) There was a full range of motion in spite of the deformity.

(4) The medico-legal aspects of such cases.

(5) The possibility of extending the term osteochondritis to a carpal phalanx.

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Lisbon, Portugal.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF PHARMACOLOGY AND THERAPEUTICS

At a meeting of this section held on Tuesday, March 8th, with Dr. J. W. Trevan, the president, in the chair, Dr. W. W. Payne read a paper on

Vegetable Proteins in the Treatment of Diabetes

He said that his paper had been originally intended as a postscript to that of the late Dr. Otto Leyton on the same subject. He had compared his results with the more extensive findings that Dr. Leyton had obtained, and they agreed in all important respects, but Dr. Leyton's paper was unfortunately now not obtainable. The dietary protein used was Proferan, a gluten-like preparation made from a variety of bean. It was claimed by the manufacturers that this substance was metabolised by the diabetic without giving rise to extra carbohydrate, and therefore without causing a rise in blood-sugar or an increase in glycosuria. Dr. Payne had tested this claim, in observations on diabetic children, in three different ways. First he added 3 oz. of proferan biscuits or cakes (containing C. 5 g., P. 20 g., F. 20 g.) to the daily diet of five children who were stabilised on certain insulin dosages. During three or four weeks no significant change was observed in their glycosuria (tested by their parents at home) or in their blood-sugar values (determined weekly at the same time of day). Secondly, in "acute" experiments, he observed the blood-sugar curves over several hours after the ingestion of equivalent amounts of meat protein and of proferan; the former were distinctly higher than the latter. Thirdly, he took children on a basic diet in the hospital ward, and added to the diet for several days either 23 g. of proferan or an equivalent amount of meat and sardines; both caused some increase in glycosuria, but less in the case of the vegetable protein. He concluded, as Dr. Leyton had done, that some patients took proferan without showing increased glycosuria, while others did excrete more sugar, but less than after a corresponding amount of meat protein. He found an increased nitrogen excretion after proferan had been taken, but the difficulties of determining nitrogen balances accurately in children made it impossible to prove that the absorption of the substance was complete.

Dr. R. D. Lawrence said that he had failed to cause a rise in blood-sugar in normal subjects by

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giving 75 g. of proferan. He agreed that the best test subjects would be adults with mild diabetes, but in general he found little use for special diabetic breads.

Dr. Lawrence then opened a discussion on

Zinc Protamine Insulin

He said that in the normal organism there was a small continuous secretion of insulin by the pancreas, on which was superimposed a rapid spurt every time a carbohydrate meal was taken. To reproduce both these processes in the diabetic by injection of extraneous insulins was a difficult task and had not yet been achieved, but the newer slow-acting insulins made possible a closer approach to it. He gave figures, based on experiment and clinical observation, for the duration of action of doses of the various insulins lying between 10 and 40 units as follows: soluble insulin, 4–12 hours; insulin retard, 8–16 hours; zinc protamine insulin, 6–24 hours or more. Hypoglycæmia was commonly observed sooner after a smaller dose, later after a larger one: with soluble insulin, at 2–4 hours; with insulin retard, at 4–12 hours; with zinc protamine insulin at 4–24 hours or later. Of zinc protamine insulin he gave usually one dose a day, in the morning, and adjusted it so as to render the patient's urine sugar-free, or very nearly sugar-free, early the next morning. In milder cases on suitable diets this dose would often keep the urine practically sugar-free throughout the 24 hours; general practitioners treating such cases would find their management easy and would seldom use anything but zinc protamine insulin. In severer cases, however, much sugar would be passed during the daytime, and in them Dr. Lawrence added a dose of ordinary soluble insulin in the morning, sufficient to bring about a normal blood-sugar level at lunch time; if glycosuria then developed in the evening and was considered undesirable a second injection of soluble insulin would have to be given in the late afternoon. But in these cases if full control of the glycosuria throughout the 24 hours was attempted, severe hypoglycæmic attacks were almost sure to develop. Dr. Lawrence had not used zinc protamine insulin in coma, and saw no occasion to do so. In some insulin-sensitive children he had observed hypoglycæmia developing surprisingly rapidly—e.g., in less than 6 hours—after doses of zinc protamine insulin as small as 12 units.

Dr. R. S. AITKEN reported some detailed observations designed to determine the duration of action of zinc protamine insulin. Patients were given 250–400 g. of carbohydrate in equal 3-hourly feeds day and night, and the time during which a given dose of the insulin exerted its effect was judged from (*a*) the return of the rate of sugar excretion to its pre-injection level, and (*b*) the reappearance of acetonuria. The two methods usually agreed fairly closely. In a given patient the duration of action was always roughly proportional to the dose, and with larger doses (60–100 units) clear evidence of persistence of action up to as long as 60 hours was obtained. The same dose would act for different periods in different patients. Dividing a dose into several fractions and injecting them simultaneously at different sites somewhat curtailed the duration of its action. Dr. Aitken thought it likely that a given dose of zinc protamine insulin developed its maximum action—i.e., the maximum rate of absorption of insulin from the injection depôt—within a few hours, and that thereafter its action gradually diminished; his findings strongly suggested this though they did not afford complete proof. If such a time-course were accepted, it followed that in treatment zinc protamine insulin should always be given in the morning and that the intake of carbohydrate over the 24 hours should be spread as widely as possible and made to decrease gradually from the morning of every day until the morning of the next.

Dr. E. P. POULTON regarded insulin retard as more nearly intermediate in its properties between soluble insulin and zinc protamine insulin, than Dr. Lawrence had indicated; he sometimes prescribed a mixture of all three insulins in one morning dose.

Dr. GEORGE GRAHAM considered that zinc protamine insulin might not begin to exert its action until 6 hours after injection; in this respect his experience did not bear out Dr. Aitken's findings. He used mixtures of soluble and zinc protamine insulins in some patients, of soluble and retard insulins in others, and he found the slow-acting insulins of great value.

Dr. PAYNE had found insulin retard less liable to cause severe hypoglycæmic reactions than zinc protamine insulin. He thought that the early absorption of quadruple strength zinc protamine insulin was faster than of double strength, and that a balance could sometimes be achieved with the former alone where the latter had failed. He had often observed that patients well balanced in hospital went out of adjustment a few weeks after returning home.

Dr. AITKEN, replying to Dr. Graham, said that he could not easily picture an injection of zinc protamine insulin lying inert at the site of injection for 6 hours and only then beginning to be absorbed. He gave high carbohydrate intakes in his experiments because he wanted to observe the amount of carbohydrate burnt or stored under the influence of insulin; he regarded that as a truer index of insulin action than the blood-sugar level, which was influenced by more factors than just the amount of available insulin.

Dr. LAWRENCE, in answer to a question, said that in giving soluble and zinc protamine insulins simultaneously, he drew both into the same syringe, the soluble first, and injected them together into the same site. There was evidence that in vitro this procedure caused some of the soluble insulin to become insoluble. He emphasised the irregularities in action of the slow insulins, which did not in routine treatment behave uniformly from day to day and week to week; for that reason he did not favour the blunderbuss method of injecting three varieties of insulin at once.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY

AT a meeting of this society held at the West London Hospital on March 4th, with Dr. D. G. RICE-OXLEY, the president, in the chair, an address was given by Dr. DONALD HUNTER on

Industrial Diseases

He referred first to the diseases of coal-miners, in particular miners' nystagmus and the condition known as "beat knee," which was caused by the cramped posture in which the men worked in the pit. In the ironmining and smelting industries great precautions had to be taken for the protection of the eyes of the workers, and until this was done the toll taken of sight was enormous. More than once it had happened that an occupational disease or liability to disease had been discovered, not by a medical man, but by those engaged in the industry. For example, it was the secretary of the glassblowers' trade-union who, at the end of last century, discovered the

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condition known as glassblowers' cataract. As a result of the precautions now taken, this condition was disappearing. The cases of anthrax treated at the London Hospital over the period 1884 to 1935 had numbered 116, of which 98 were occupational. Only 1 of these was of the deadly pulmonary type, and among all the cases there were only 11 deaths. Dr. Hunter described the precautions taken to prevent anthrax among woolsorters by the careful cleansing of all wool at the port at which it was landed in this country. The same methods of protection were not applicable to furs and skins. Weil's disease was an infection of very wide occurrence to which London sewer workers were particularly liable. It was also found in workers in the sugar-cane fields of Queensland and on the canals of Holland. After discussing some of the new diseases associated with developments in chemical industry, such, for example, as the use of alkalis for chlorination processes, Dr. Hunter mentioned the heavy toll of life that lead poisoning had exacted. Even now, owing to the carelessness of workers in some departments, lead poisoning was not rare; the spraying of lead pigment by means of a gun was particularly dangerous. Alkalis headed the list of causes of occupational dermatitis. Chromium salts also caused a very severe dermatitis. Among occupations which involved the risk of cancer the industrial use of X rays should not be overlooked. Many industrial workers were now using powerful X ray apparatus, and it seemed possible that the same calamity might befall some of them as befell the early medical pioneers in this subject.

After discussing briefly diseases due to dust, Dr. Hunter summarised the various means available for preventing disease in industry. The first line of prevention was the elimination of dust and fumes; the next was the installation of protective apparatus uncontrolled by the workman, and the third, the education of the workman as to the nature of his dangers. Cleanliness of working places and the bodily cleanliness and general hygiene of the worker were obviously important. In Dr. Hunter's view England protected the workman in its factories against disease better than any other country in the world, not excepting Germany, where the regulations were more stringent but were less punctiliously followed. England had also the advantage of a factory department of the Home Office which was at all times ready to give advice and to take any necessary action.

MEDICAL SOCIETY OF LONDON

AT a meeting of this society held on March 14th, Mr. J. E. H. ROBERTS, the president, being in the chair, a discussion on

Uræmia

was opened by Dr. T. IZOD BENNETT. The word, he said, implied a physical disturbance resulting from severe renal failure. English physicians had not paid close attention to the condition until the beginning of the century, when the work of Widal and his collaborators in Paris had become widely known. The outstanding chemical change in every case was the increase in the blood-urea. The calcium was diminished, the phosphorus was increased, and there was often a considerable diminution in the alkaline reserve. These changes were closely related to the clinical syndrome. The clinical phenomena consisted mainly in gastro-intestinal disturbance, chiefly marked by a progressively severe vomiting and sometimes by diarrhœa; drowsiness, deepening to terminal coma; neuromuscular instability, sometimes amounting to tetany; fits; increase of pulmonary ventilation, or hissing respiration of the classical type.

The drowsiness and coma were closely linked to the increase in the blood nitrogen, and it was hard to escape the conclusion that they were directly caused by urea intoxication. Animals could be perfused with urea without coma resulting, but in man the accumulation of urea in the blood to which Bright had called attention was always associated with the depression of the central nervous system which was the major symptom in uræmia. A high blood-urea might occur without the clinical manifestations of uræmia. If, however, nitrogen retention was sufficiently low and insidious in its increase, it might rise to an extreme value before any great disturbance appeared. The same explanation applied in alkalosis. The phenomenon merely illustrated the important physiological axiom that symptoms due to changes in the blood chemistry manifested themselves in proportion to the abruptness rather than the mere degree of the change. The chronic alcoholic was seldom drunk, and the drug addict often exhibited very few obvious symptoms. A diabetic taking ordinary insulin might display hypoglycæmic symptoms which he would not show when his blood-sugar was even more greatly reduced by one of the slow insulins of the zinc type.

Bright's original work had contained nearly all the present knowledge about uræmia, and the question might be asked why the recognition of his discovery had been delayed for nearly a hundred years. The explanation was that it had taken a very long time for the important clinical manifestations of hypertension to become recognised. Hypertension, although it very often accompanied chronic renal destruction, was by no means invariable. It could occur with perfectly normal kidneys and might itself produce striking cerebral phenomena which could be confused with the symptoms of uræmia. The use of the sphygmomanometer and ophthalmoscope, together with some clinical acumen, were sufficient to distinguish hypertension from uræmia. In a vast number of cases, however, both syndromes were present together, and recognition of the nature of uræmia had been delayed by the difficulty of differentiating between them. Anything which could precipitate severe renal failure would tend to produce uræmia. The possible causes of renal failure were very numerous and, apart from purely medical causes, nervous shock and psychic factors could play a part. Surgery had been known to precipitate uræmia through the reflex effects of instrumentation in the lower urinary tract.

Dr. Bennett illustrated the problem of suppression of urine by two cases. In one the patient—as often happened—died of the cardiovascular complications. The other patient, in whom the cause was acute infective nephritis, had been quickly cured by drastic restriction of the diet.

Mr. A. DICKSON WRIGHT dealt with the surgical aspect of uræmia. He said that whether uræmia was caused by some insidious and undiagnosed kidney disease (medical uræmia), or was the result of long-standing urinary obstruction (retention uræmia), it might produce unusual signs and symptoms which closely mimicked some surgical emergency and might lure the surgeon into a disastrous operation. The chief error was to mistake the uræmic vomiting and abdominal distension for intestinal obstruction, for obstinate constipation was often a symptom. Radiological examination should be made as a matter of

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routine when obstruction was suspected. The terminal colitis of renal disease might add rectal blood and mucus to the picture of vomiting and distension. The comatose dilatation might produce difficult problems, especially when the patient showed localising neurological signs, for there was then a great temptation to open the skull for cerebral tumour. Often, before entering the final coma, the patient had a heavy fall from uræmic vertigo or seizure and injured the head, and when coma supervened there might be a great urge to trephine. About the time that uræmia developed, the terminal infections of urinary disease often made their appearance, and it was then a waste of time to drain the peritoneum or pleura. The œdema fluid might become infected, and drainage should not be performed if the patient was on the verge of uræmia.

Medical uræmia came within the purview of the surgeon in renal rickets. Cystotomies undertaken for the cure of this condition often precipitated a fatal uræmia. Operations for renal decapsulation were occasionally asked for in cases of suppression. Denervation of the renal pedicle had been advocated, and injection of novocain in the region of the cœliac ganglion had been effective in overcoming suppression.

Surgical or retentive uræmia was apparently almost a different disease. The surgeon looked in vain for the muscular spasms, the epileptiform convulsions, the hemiplegias, and other symptoms of the medical type. It might be acute, and the commonest type occurred after operation on the urinary tract, especially upon the prostate. After a short period of drowsiness and delirium the patient passed into terminal coma. Death in uræmia might follow operations on or injuries to the biliary tract or liver. Long-standing jaundice due to obstruction of the common bile-duct might cause the patient's death about a fortnight after operation through the damage it did to the renal parenchyma. Chronic surgical uræmia might be manifested by a large variety of puzzling symptoms. Surgical uræmia was best treated by a constant intravenous drip, salt or glucose being provided according to the blood chloride estimation. Any simple procedure for overcoming obstruction should be carried out and stones should be removed. If both ureters had been ligated, the best procedure was bilateral nephrostomy. Operative decompression of the urinary system should be very slow.

Dr. WILFRID OAKLEY spoke of the relationship between renal function and the acid-base equilibrium. The alkali reserve was a useful guide to the state of this balance. In dealing with acidosis it was important to distinguish between cause and effect. Uræmia due to chronic renal disease was nearly always associated with acidosis due to the inability of the severely damaged kidney to form ammonia. A kidney might be structurally healthy but have its efficiency impaired by the increased formation, or administration, of acids. In severe diabetic coma a considerable rise in the blood-urea was not uncommon. Healthy kidneys might function well in spite of severe disturbance of the acid-base balance, but damaged kidneys might be greatly affected by comparatively small fluctuations. Intensive treatment of urinary infection by mandelic acid or ammonium chloride might produce a marked rise in blood-urea. Tests for renal function should be carried out in all suspicious cases of urinary infection before these drugs were given. Alkalosis might result from the administration of alkalis or from the loss of chlorine by vomiting. The loss of chlorine rather than the alkalosis then produced the renal failure.

Mr. H. B. WINSBURY-WHITE spoke of the advantages of pre-operative catheterisation to lower the blood-urea. Instrumentation, however, had its dangers, and he never carried it out in the consulting-room on an elderly prostatic patient. When it could be followed immediately by the fitting of an indwelling catheter uræmic symptoms rarely appeared, and renal function after the operation was likely to be better. The catheter itself might precipitate uræmia when the renal function was badly reduced, but these cases were much less frequent than those in which its use was valuable.

Dr. GEORGE GRAHAM said that alkalis were not of much use in medical uræmia but might be of considerable help to the surgeon. He asked why severe anæmia should often be associated with chronic uræmia and why iron had no effect. The diet of fruit juice, sugar, and water advocated by Dr. Bennett for acute nephritis would cause excretion of at least 7 g. of nitrogen and 42 g. of protein a day. He suggested administering about that quantity of protein to maintain the nitrogen equilibrium and avert protein destruction.

Sir WILLIAM WILLCOX stressed the importance of a blood-urea test in suspected uræmia. Cystic kidney might be associated with latent uræmia. The patient might have a very high blood-urea without any symptoms, and an accident or an attack of influenza might precipitate acute uræmia. The clinical symptoms were determined by the suddenness of the change. The toxæmic kidney would send up the blood-urea very high, but recovery was common. It might be due, among other causes, to respiratory infection or to the inhalation of a poisonous gas such as carbon tetrachloride. One patient had succeeded in obtaining heavy damages from a court of law for alleged food poisoning from a beef sandwich on symptoms due entirely to uræmia.

Mr. V. ZACHARY COPE confessed to grave doubt about the nature of uræmia. It was not necessarily associated with kidney disease; it was sometimes associated with grave hepatic disease. It was not simply due to high blood-urea. It was more likely to be due to two or three separate conditions, which would have to be distinguished before knowledge could be advanced.

Dr. T. JENNER HOSKIN advocated venesection, followed by transfusion, in certain cases, but pointed out the need for care when anæmia was present. One of the chief reasons for a two-stage prostatectomy was that it diminished the risk of uræmia.

Dr. G. W. GOODHART remarked that he had been taught as a student that uræmia was not caused by high blood-urea, and that a patient might die of uræmia with a low blood-urea.

Dr. BENNETT, in reply, mentioned the great importance of the specific gravity of the urine. Possibly, he suggested, the anæmia of chronic renal failure represented the toxic effect on the marrow.

DEVON AND EXETER MEDICO-CHIRURGICAL SOCIETY

A MEETING of this society was held on Feb. 24th, with Dr. ROBERT SCOTT, the president, in the chair.

Dr. FRANK ROPER described

A Type of Chronic Lung Disease

which, for want of a better term, he called emphysema of unknown origin and demonstrated an illustrative

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case. A married woman, aged 42, had always had a cough, but without hæmoptysis and with very little sputum. For the past five years she had had attacks of vomiting and abdominal pain. Within the last 18 months her weight had decreased from 8 st. to 4 st. 13 lb. Her fingers were clubbed but repeated examination of her scanty purulent sputum had failed to detect tubercle bacilli. Radiological examination of the chest showed a large translucent area at each apex, the right larger than the left. Elsewhere, especially in the upper half of each lung, a large-celled honeycomb or cyst-like structure was present. Similar but less pronounced changes were observed radiologically in 1935. In Dr. Roper's view the diagnosis rested between (1) congenital cystic disease of the lungs with secondary infection, (2) bronchiectasis, and (3) tuberculous cavitation. He invited suggestions as to treatment.—Dr. R. L. MIDGLEY agreed that treatment in such cases was a more urgent matter than diagnosis. He advocated a general sanatorium régime. Antiseptic inhalations were worth a trial, and aspiration of the cavities through a bronchoscope might help. Despite the apparent scantiness of sputum it should not be assumed that the lungs were free from secretion and by far the most hopeful method of treatment was postural drainage. The simple rule of trial and error would determine which posture was best.

A Uterine Abnormality

At the same meeting Dr. MARSHALL SCOTT showed a decidual cast from the non-pregnant horn of a bicornuate uterus, a relatively common abnormality. The fœtus at the thirty-seventh week was found to be presenting by the breech and version was difficult. During labour the rotation of the fœtal head was delayed in mid-pelvis but, after manual rotation, forceps delivery was easy. The uterine abnormality was diagnosed immediately after delivery of the fœtus and placenta. The fœtus came from the right horn and the cast was expelled from the left on the fifth day of the puerperium. Microscopically the cast showed decidual changes and a good deal of small round-celled infiltration with a few polymorphonuclears. Decidual cells were not numerous and necrotic changes conspicuous. Dr. Marshall Scott pointed out that uterus bicornis was a frequent cause of sterility and abortion and that if the horns were unequal in size, one of them was frequently "blind."

REVIEWS AND NOTICES OF BOOKS

Genital Abnormalities, Hermaphroditism, and Related Adrenal Diseases

By HUGH HAMPTON YOUNG, M.A., M.D., Sc.D., F.R.C.S.I., D.S.M., Professor of Urology, Johns Hopkins University; Visiting Urologist, Brady Urological Institute, Johns Hopkins Hospital. London: Baillière, Tindall, and Cox. 1937. Pp. 649. 45*s*.

THIS encyclopædic text-book on genital abnormalities begins with an introductory account of hermaphrodites in literature and art. The reproductions of classical statues of "Hermaphroditos" suggest, perhaps, that the artist was seeking to represent an individual who combined the strength of man with the grace of woman, and not an unfortunate victim of hypospadias and gynæcomastia. In the remote past such malformed individuals were sometimes worshipped, sometimes killed; they may have suggested the conception of the divine Hermaphroditos who incidentally was always portrayed as beautiful if immodest.

Prof. Young describes the development of the genitalia in relation to the origin of the various types of abnormalities which he differentiates. There seems to be no abnormality conceivable by the most ingenious teratologist that has not been actually reported, with the one exception that no person has been found capable of acting both as a father and a mother. Ovary and testis may be present together in one individual, or male and female cells may lie side by side in the same organ; and there are many records of what Prof. Young calls "practising hermaphrodites," who have sexual intercourse with both males and females. His views on the influence of the endocrine glands in the development of the primary and secondary sexual organs are thus stated:

"The two great forces in determining the sex development of the individual are, first, the initial germinal impulse dependent on the chromosomal pattern of the zygote and, second, the endocrine glands. The former factor is presumably dependent on a quantitative balance between the male and the female elements of an always bisexual cell, and this balance is capable of partial or complete reversal by abnormalities in the endocrine system, with the production of sex intergrades of one sort or another. The chromosomal impulse is probably most important in the early phases of sex differentiation, the endocrine system in the later stages. The character and degree of intersexual phenomena depend largely on the phase of development at which the sex switch occurs."

The close connexion between the genitalia and the suprarenal gland is illustrated by the case, reported by Gordon Holmes, of a well-formed girl who developed very definite male characteristics. A benign tumour was found in the right suprarenal region, which Percy Sargent removed and the patient lost all her male attributes. Such successful operations have led surgeons to remove part of the suprarenal glands in such cases. Prof. Young describes an operation which he has devised for the simultaneous exposure of the two glands; he claims that in this way the surgeon can estimate the amount of suprarenal tissue present and the amount to be removed. This seems to be a severe operation not to be lightly undertaken; and indeed the caution applies to many operations here described which are undertaken mainly for psychological reasons. Except in cases where full and fertile sexual function can be restored, the surgeon must carefully study the facts and circumstances before operating. This applies especially to operations purporting to change the apparent sex of the patient; for example an individual might be better off as an imperfect male, even with some ovarian tissue inside him, than as a female with a vagina constructed out of peritoneum or from an artificial cavity in the pelvic cellular tissue.

The weakest part of the book is that dealing with the surgical treatment of hypospadias. Many plastic operations are described and elaborately illustrated by drawings, but it is disappointing to find no photographic illustrations of the end-results. (Incidentally the artist, who has made some beautiful drawings, has fallen into the common error of representing the sutures as drawn so tightly that they would inevitably cut out.) The work of the English surgeons who

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use the hooded prepuce, transplanted to the urethral aspect of the penis, to form a new urethra is ignored, though this method has proved successful in all degrees of the deformity. In the large plate representing the varieties of atresia ani the one in which the reflection of the peritoneum from the rectum occurs well below the normal level is not represented. In these cases the bowel can be felt at the upper end of the anal canal and an incision produces a copious evacuation of meconium. The peritoneum is however wounded and the patient dies of septic peritonitis.

Le chirurgien devant l'état puerpéral

By MARCEL METZGER, Professeur agrégé à la Faculté de Médecine de Paris; Accoucheur de l'Hôpital Bichat. Paris: Masson et Cie. Pp. 335. Frs.52.

THE author of this unusual book sets out to help the general surgeon called to examine and treat a pregnant woman. The advice given follows English teaching in many ways, although in our view the surgeon is encouraged to perform hysterectomy rather too readily. After Cæsarean section sterilisation by hysterectomy rather than excision of the tubes is recommended, and in the presence of fibroids Cæsarean hysterectomy. The fact that fibroids do not necessarily interfere with a normal labour and puerperium is made clear but little guidance is given on the factors that influence the prognosis. Pre-arranged Cæsarean section is favoured before term, rather than operation during the course of labour. After reduction of inversion of the uterus the author advocates firm packing of the uterine cavity—a policy with which British obstetricians will not agree.

An interesting sidelight comes from the preface on the sequence of consultations in France where the pregnant woman is evidently liable to be subjected to examination first by a general surgeon, should some abdominal emergency arise, rather than by an obstetrician. The obstetrician's reputation for surgical judgment and technique is evidently not so well established as it is in this country.

Lectures on the Epidemiology and Control of Syphilis, Tuberculosis, and Whooping Cough

And Other Aspects of Infectious Disease. By THORVALD MADSEN, M.D., Director of the State Serum Institute of Denmark, Copenhagen; Chairman of the Health Committee of the League of Nations. London: Baillière, Tindall, and Cox. 1937. Pp. 216. 13*s.* 6*d.*

THESE lectures, delivered by Dr. Madsen at Vanderbilt University in 1937, formed the fifth series of the Abraham Flexner lectures. Three of them deal with the specific diseases named in the title with, naturally, particular reference to them as observed in Denmark. The other two are more general discussions, the one of the mechanisms of bacterial infection, the other of the influence of the seasons on infection. The inclusion of syphilis is appropriate, for Denmark, some century and a half ago, was the first country to adopt legislation for dealing with the spread of venereal diseases—legislation giving access to free treatment and at the same time making submission to treatment obligatory. Dr. Madsen gives a clear account of the present relatively favourable position of his country with regard to venereal disease and of the methods of control and treatment that he believes have led to it. Denmark is also fortunate in having a very low death-rate from tuberculosis. Much of Dr. Madsen's discussion of it turns upon the investigations being made there to discover and eliminate the present sources of infection, by tuberculin testing, by determining the frequency of bovine infections, by vaccination with B C G, and so forth. In agreement with other students of vital statistics he lays stress on the growing relative importance to-day of whooping-cough amongst the infectious diseases of childhood. We hardly regard as justified his statement that the higher death-rate of females over males from this cause, contrary to the general rule of mortality, is not due to a greater susceptibility of females to attack. Statistics of incidence are not easily to be found but certainly some of those available do not bear out his belief that the sex-incidence of infection is about equal. The favourable results of vaccination against whooping-cough he illustrates from experiments made in Denmark and in the Faroe Islands.

These lectures contain much that will interest both the epidemiologist and public health worker. The only adverse comment we have is that some of the diagrams—e.g., that on p. 180—are not worthy of the subject matter; the small scale reproduction makes them unreadable.

Practical Proctology

By LOUIS A. BUIE, A.B., M.D., F.A.C.S., Head of Section on Proctology, the Mayo Clinic; Professor of Proctology, the Mayo Foundation for Medical Education and Research, Graduate School, University of Minnesota. London: W. B. Saunders Company. 1937. Pp. 512. 30*s.*

THIS is a provocative and stimulating record of a clinician's wide personal experience of proctology. It is the differences rather than the resemblances between practice at the Mayo Clinic under Prof. Buie's direction and that generally adopted in this country to which we propose to draw attention. For example, the Hanes table—a piece of apparatus not often seen in England—is strongly recommended. Proctoscopy is carried out in the inverted position and operations are undertaken with the patient prone, a pillow being placed under the pelvis—two practices which might well be more generally adopted. Pruritus ani is discussed at some length. The only treatment advocated is the injection of 20 c.cm. to 40 c.cm. of 40 per cent. alcohol round the anus with the object of producing a slough of the whole of the peri-anal skin. This appears to be an effective if extremely drastic form of attack. It is to be noted, however, that the author states (p. 250) that "often there is extreme loss of the superficial tissues of the anus and its external margins, and because of this, at the clinic we never fail to impress on our patients the possibility of a secondary operation in order to correct the contracting deformity." And a little later he adds (p. 254) "in many cases, frequent dressings are necessary, and the surgeon may become discouraged as he observes the unpleasant result of his handiwork. There may be a bad odor and it may appear impossible to restore the outlet of the bowel to anything like its normal state, but perseverance will win out." Of 125 patients who submitted to this treatment, it is claimed that 116 were completely free of itching for two years or more.

Another controversial question raised is whether it is desirable to instruct the general public to wash

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or to wipe the anus after a defæcation. The author holds that "even among the most refined people" the attempts usually made to clean the contaminated parts are quite inadequate, and goes so far as to suggest the daily use of a small warm enema of plain water or saline solution after evacuation of the bowel. It seems to us very doubtful if this method has much to commend it; a patient administering an enema to himself is more likely to soil his hands and clothes with fæcal material than to succeed in making any substantial difference to the number of bacteria left round the anal orifice. The comments on ulcerative colitis are optimistic in tone. A form of the disease caused by a streptococcus is termed thrombo-ulcerative colitis. The symptoms and signs are discussed and the assurance is given that vaccine and serum therapy are likely to produce a cure. Colostomy, ileostomy, and cæcostomy are, in our view, rightly condemned. Errors have crept into some anatomical descriptions. On p. 55 the middle sacral artery is made to run anterior to the left common iliac vein, and the right common iliac vein is placed superior and lateral to the right common iliac artery.

The last chapter is devoted to diet and to prescriptions, and the index is excellent. The style is concise and clear, and the book is very readable.

Therapie der Tuberkulose

Edited by Dr. J. VERBERICH and Dr. P. SPIRO. Leyden: A. W. Sijthoff's Uitgeversmaatschappij. N.V. 1937. Pp. 845. H.fl.25.

THIS solid work exemplifies the modern attitude to the treatment of tuberculosis—that it should aim not merely at the restoration of function of a particular organ containing a tuberculous focus, but at the cure of a generalised infective disease. Naturally such a conception has led to an extensive rather than an intensive development of the subject and the book contains fairly long chapters which are only indirectly related to therapy in the strict sense of the word. There are, for example, sections on the biology of the tubercle bacillus and the acid-fast saprophytes, sero-diagnosis and immunity which, though thoroughly up to date and informative, occupy space that might well have been devoted to more detailed consideration of actual methods of treatment. But a wide and generous interpretation of the term "therapy" has advantages and it is better to cast the net widely than to restrict unduly the scope of an important survey of our knowledge. The historical introduction by the veteran professor—Albert Fraenkel of Heidelberg—provides an interesting retrospect of the rise of the sanatoria, special hospitals, and other social movements of the nineteenth century in the fight against tuberculosis. Of the other chapters—all written by men with international reputations—those on the special sense organs, the psychoses, old age, diabetes, and pregnancy in association with tuberculosis stand out, perhaps because they are often inadequately reviewed. The long chapters on modern thoracic surgery and on bone and joint tuberculosis escape the tedium associated with descriptions of the minutiæ of operative technique, but enough detail is offered to give the general reader an intelligent understanding of the problems involved. It is a relief to find the text only sparsely interrupted by diagrams or radiograms which usually take up far too much space in modern text-books on tuberculosis. A short chapter on the comprehensive subject Fürsorge in tuberculosis (we have no adequate English substitute for this word) includes brief vital statistics. If a second edition is called for more space should be devoted to symptomatic treatment, especially in the care of the advanced case. The chapter on work-therapy is comprehensive, covering the activities of most of the well-known colonies, settlements, and workshops in Europe and America.

Treatment of Clinical and Laboratory Data

An Introduction to Statistical Ideas and Methods for Medical and Dental Workers. By DONALD MAINLAND, M.B., Ch.B., D.Sc. Edin., Professor of Anatomy, Dalhousie University, Halifax, Nova Scotia. Edinburgh and London: Oliver and Boyd. 1938. Pp. 340. 15*s*.

Prof. Mainland has been led in his own work and in the discussion and observation of the work of others to the consideration of modern statistical methods as applied to clinical and laboratory data. In interpreting these, and indeed any other, statistical data obeisance has to be made to the goddess of chance—in short, we have to determine as accurately as possible when a result observed is quite likely to be due merely to chance, and when chance is an unlikely explanation of it. Prof. Mainland's book is primarily an attempt to discuss that problem in simple terms, to show the clinician and other workers in medicine why and also how allowance should be made for chance in interpreting results, especially with small samples of observations. Wisely Prof. Mainland is not content with expounding merely a technique but aims at showing, as he expresses it, the reasonableness of the methods and formulæ he illustrates, rather than their exact mathematical reason. It is doubtful how far he has succeeded in this latter aim; whether in fact his discussion will be quite as simple to the average medical man as Prof. Mainland's own clear grasp of principles makes it appear to himself. To take an example, his introduction of the binomial expansion and normal curve for estimating the probability of certain proportions occurring in samples seems to us too rapid. Both here and elsewhere in his book more halting steps would have been appropriate for the audience he has in mind. He gives a detailed and well-illustrated discussion of the chi-squared test, and his remarks on those much-abused terms "significant" and "non-significant" are apposite. Other chapters deal with the variability of measurements, the simple analysis of variance, errors in measurement, correlation and curve fitting, and the publication of data and results. In the discussion on graphs is included (pp. 277–8) a quotation from Raymond Pearl which is difficult to follow out of its context.

In general we regard this book as valuable to the medical man already familiar with the foundations on which mathematical statistical methods are based rather than to the complete beginner.

CONGRESS OF COMPARATIVE PATHOLOGY.—The fourth International Congress of Comparative Pathology will meet in Rome from May 15th to 20th, 1939, under the presidency of Prof. Pietro Rondoni. The work of the congress will be divided into three sections: human medicine, veterinary medicine, and phytopathology. The main subjects for discussion will be ultravirus diseases, heredity in pathology, function of the associated antigenes, and regressive processes in plants. Further information may be had from the hon. secretary of the British Committee, 10, Red Lion-square, London, W.C.1.

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THE LANCET

LONDON: SATURDAY, MARCH 19, 1938

NEW PLANS FOR CHEMOTHERAPY

FOREMOST amongst the matters discussed in this year's annual report of the Medical Research Council noticed on p. 683 is the big subject of chemotherapy. There will be widespread satisfaction at the news therein of the Council's plans for establishing chemotherapeutic research on a national basis. Medical men have no need to be reminded of the paramount importance of chemotherapy, particularly in the control of tropical diseases.

Many factors have contributed in the past to the lack of brilliant achievement in this field in Britain. Particular difficulties attach to research in chemotherapy. It is necessary on the one hand that chemists should laboriously synthesise new compounds to be tested. They may prepare substances analogous to others of known activity or, taking a shot in the dark, may produce compounds of quite new types, whose potential therapeutic value cannot be guessed and may well be nil. (It must have been a biochemist of whom it was recently broadcast: "He used to be a doctor, but he gave it up when he found a wonderful cure for which there was no disease.") While we are beginning to learn a little of the relationship between chemical structure and biological activity, there is still much more chaos than there is order and most of the research is still on hit-or-miss lines. Unfortunately the work of making substances to be tested rarely has enough purely chemical interest to attract young chemists to it. There have also been difficulties on the biological side. What the chemist has synthesised the biologist must test. Until recently chemotherapeutic achievement has been almost entirely in the field of spirochætal and protozoal infections, of which those amenable to laboratory investigations have been in the main trypanosome infections of rats, mice, and rabbits and malaria in canaries. It is unfortunately not always true that an agent which is therapeutically active against an infection in a small laboratory animal is equally effective against a closely related, or even the same species of parasite, in man or other larger animals. Since, however, it is impracticable to test all possible compounds directly on infections of man or of cattle, the small laboratory animal has to serve, in default of anything better, for a preliminary sorting-out of the offerings from the chemical laboratory. And it is true here also that this sorting-out process may degenerate into a dull routine. It is not to be expected that more than a very small proportion of the work will be directly rewarded by obvious success. The subject is thus not one that appeals to many young research workers and few take it up as a life-study. Most of the outstanding successes of chemotherapeutic research—the salvarsan group of drugs, Bayer 205, Atebrin, Plasmoquine—have come from Germany, where great industrial firms have for many years organised long-term programmes, and where large staffs of chemists and biologists have worked in close collaboration.

Realising that our backwardness in this field reflects no credit on a country with vast interests and responsibilities in the tropics, the Medical Research Council and the Department of Scientific and Industrial Research organised in 1927 a coöperative scheme under the direction of a chemotherapy committee. This body had at its disposal an annual grant of modest dimensions, with which it supported chemical research at a number of centres in the country, and also biological centres for testing the products of their activities and for investigation into underlying fundamental problems. While some substances of promise have come to light from this work—notably Neocryl, which seems likely to have value in the treatment of syphilis and trypanosomiasis—it cannot be claimed that the successes have been numerous or dramatic. A number of approaches were made to industrialists in this country, in the hopes of interesting them in the possible organisation by British industry of planned research such as had been so fruitful in Germany. No response, however, was forthcoming. Unfortunately the government's financial support of the scheme had, for reasons of economy, to be seriously cut down in 1931. Eighteen months ago, when circumstances were more propitious, the Medical Research Council was able to put before the government a very strong case for support on a much larger scale than anything yet undertaken. They could point out the enormous losses caused by tropical diseases of the type which chemotherapy might be expected to control, the moral and material disadvantages of our dependence upon foreign enterprise, and the failure of existing facilities in this country to make adequate progress in this particularly difficult field. A new factor was the astonishing success of Prontosil, sulphanilamide and related compounds, in bacterial infections, a sphere in which chemotherapy had shown but little promise of success. Medical men became familiar with the recital of new triumphs almost every week. Advance here was so rapid partly because of the readier accessibility of bacterial infections to laboratory study and there seemed every reason to hope that exploitation of this region of chemotherapeutic research would lead to fresh successes, if adequate facilities could be provided.

H.M. Government could hardly fail to be impressed by these arguments, and Mr. NEVILLE CHAMBERLAIN announced rather more than a year ago that a grant of £30,000 per annum would be allocated to the Medical Research Council for research in chemotherapy. The first year's income, or rather more, will be used for the erection of buildings. The Council's scheme involves the creation of a central chemotherapy institute, with a director, assistant director, and a full-time staff of trained biologists and chemists. The function

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of their staff, as projected, would include, not only direct participation in certain lines of chemotherapeutic research, but the planning and coördination of the work in this field supported from the Council's fund in chemical and medical laboratories elsewhere. This institute will, we understand, probably form one wing of the building of the National Institute for Medical Research when this is rebuilt in the near future at Mill Hill. In addition, support will be given as hitherto, but on a larger scale, to chemical and biological work in chemotherapy in laboratories all over the country. Here is a scheme which offers promise of great achievement. Biologist and chemist will be working together in one building, able to discuss together their day-to-day problems and to acquire an insight into their common problem which has been almost impossible in the past. The scheme will, of course, have to face difficulties. It will not, for instance, be easy to find adequately trained biologists and chemists for the new centre. We are confident, however, that difficulties will be overcome, and that an important new chapter in British medical research has been opened.

SOCIAL REHABILITATION OF PROSTITUTES

THE rehabilitation of prostitutes has been a subject of heated debate for many centuries. The methods adopted to this end have varied from the orders given by the court of governors of St. Thomas's Hospital in 1599—that the patients should be beaten after discharge to discourage them from sinning again and "that by the terror thereof others may be admonished from falling to the like vice"[1]—to the occupational training given during treatment in the prophylactoria of the U.S.S.R., where efforts are made to place patients in suitable posts after recovery. Free treatment for venereal diseases is now organised by the State in most countries, but the so-called social services—follow-up, financial help during treatment, moral guidance, and vocational training—are still lacking in many of them. The League of Nations therefore issued a world-wide questionnaire on the subject in 1935, and the answers have now been summarised.[2] Twenty-two of the forty-eight countries replied that there were no social services available for prostitutes. In most of the others attention, it is said, is paid more to their medical than to their social or moral rehabilitation, and in some attempts to promote the latter have been given up as useless. Even in the United States there is "little or no direct effort to improve the patients' morals or to provide vocational training." In Russia the Commissar in Public Health works on the assumption that "in a worker's state there is no place for prostitutes." The government therefore sets itself the task of suppressing prostitution and has taken up rehabilitation as a means to that end. There is no attempt to reform prostitutes unless they have venereal disease; they are then treated in prophylactoria, first to cure them secondly to educate them to work, and thirdly to enable them to earn their living afterwards. The length of treatment is eighteen months on the average; a shorter period has been found useless. It is claimed that the system has been a success. Of 3800 women treated in Moscow, 56 per cent. found employment afterwards, and 90 per cent. of those who found employment remained in their jobs. The Russian experiment, of course, has a limited application outside the U.S.S.R. because the practice of prostitution in Russia does not produce material gain—luxurious rooms, clothing, or food—and there is no difficulty in finding employment for women after completing treatment. Estonia tried to follow the example of Russia, but the experiment proved a failure.

In France there is a special division of the "service social à l'hôpital" which deals with rehabilitation. It has been established now for twenty years and is State-aided. Its function is to overcome the moral, social, and economic obstacles that retard or prevent the prostitute from resuming her place as a useful member of society. The social assistants are generally trained nurses who have taken up social work as a special branch, and do not therefore correspond with the almoner as understood in this country. Our almoner service was primarily started to prevent hospitals from being exploited; and follow-up, care of patients after discharge, and philanthropic work were added to this function later. The French system was started primarily for the patients, and has nothing to do with hospital finance. The duties of the social assistants are to instruct the patient in the nature of her illness, ensure regular and continuous treatment, trace the source of infection and any infected contacts, and to give help and advice.

In England social service for the rehabilitation of prostitutes has been in existence for over 150 years, though apparently those conducting the League of Nations inquiry are unaware of this fact. It was started in London by the Rev. THOMAS SCOTT, the commentator, when he founded the rescue home attached to the London Look Hospital in 1787. SCOTT was chaplain to the hospital, and he found it was impossible to do anything for the moral benefit of the patients unless he could provide them with shelter, food, and clothing for a considerable period after they were fit for discharge from hospital. The rescue home was therefore started alongside the hospital, and suitable patients were transferred there as soon as they had reached a non-contagious stage. They were taught dress-making, laundry work, and domestic duties. When cured they were found suitable posts, supplied with an outfit, and given a bonus for each year they remained in the post found for them. That is probably still the best system if it is carried out with wisdom and humanity, but it is obviously very expensive. Accordingly the London County Council, when they took over the poor-law infirmaries in 1930, tried the "hostel" system; there are seven of these hostels in London. In them women are

[1] Parsons, F. G., History of St. Thomas's Hospital, Vol. I, p. 240, London, 1932.
[2] Social Sources of Venereal Disease. League of Nations Publications. London: Allen and Unwin. 1938. Pp. 66. 1s. 3d.

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given free or cheap board and lodgings, and carry out their treatment at the hospitals to which the hostels are attached. Not many adult prostitutes find their way into them. A certain number of young women who have just lapsed into prostitution are admitted; but the greater number are wage-earners who for the time being are unable to earn their living. By taking them in hand, looking after their creature comforts, and giving them the shelter of a home temporarily such women are often saved from prostitution. One advantage of the system is that girls are not cut off from the outside world, as they would be in a home, and so have not to be reacclimatised to the world again. The disadvantages are that a hostel is not a suitable place for women in the acute stages of venereal disease, for pregnant women, or for girls on probation. These require institutional treatment. In France this is given in hospital until patients are fit for ambulatory treatment; but in England the Lock Hospital authorities have found from long experience that such women do best if kept until cured. The London County Council have now followed this example, in spite of the extra cost entailed, because they too have found that women who are willing to remain as in-patients in the wards will not come back regularly for treatment once they have left.

It may thus be seen that most European countries are taking this problem in hand, and handling it after some method adaptable to each country's national character. The results of these experiments in social reclamation, if judged from the *percentage* of genuine rehabilitation, are disappointing. But if one thinks rather of the individual women that have been rescued from misery, and saved from spreading disease, it seems well worth while to persevere and extend this work in spite of many disheartening failures.

THE THERAPEUTIC POSSIBILITIES OF HEPARIN

THE anticoagulant substance known as heparin was discovered accidentally in 1916 by JAY MCLEAN while he was working in W. H. Howell's laboratory; it was subsequently investigated by HOWELL and HOLT (1918) but it is only within the last ten years that interest in the practical exploitation of its properties has been revived. This revival is due in part to C. H. BEST and his associates in Toronto and in part to a group of workers in Stockholm. Until quite recently preparations of heparin have not been pure enough to allow of its introduction into the body, though hæmatologists have found it a serviceable anticoagulant for drawn blood. The work of CHARLES and SCOTT (1933) and of E. JORPES (1935) has now, however, made the substance available in a form that can be introduced into the blood intravenously without the production of untoward symptoms. Studies of the chemistry of heparin have led JORPES to believe it to be a mucotin polysulphuric ester[1]; and with others[2] he has put forward reasons for suggesting that it is produced by the tissue mast cells throughout the body and that it may normally have the function of a physiological anticoagulant. The possible scope of heparin in medicine has been extended by this work and its developments. WILANDER[3] has shown that heparinised samples of venous blood may be used for routine hæmatological examinations as well as for measuring the sedimentation-rate and also for determinations of blood-sugar, calcium, uric acid, non-protein nitrogen, and phosphatase. This discovery should reduce considerably the trauma which the hapless patient now suffers at the hands of clinical pathologists. Heparin has also been tried as an intravital anticoagulant for blood transfusion and in the treatment, prophylactic or therapeutic, of intravascular thrombosis. We published last year a review by HEDENIUS of 150 transfusions for which the blood donor had been "heparinised," no other anticoagulant being applied. Although no ill effects were observed this method seems to have no advantage over the simpler technique of adding sodium citrate to the shed blood and is of interest rather as a tour de force than as a useful addition to the armamentarium of a transfusion service.

The hope that heparin in suitable dosage may act as a prophylactic against post-operative thrombosis has some experimental justification. BEST and his colleagues have shown that in heparinised dogs thrombotic occlusion of traumatised veins does not take place and, more recently, that in such animals blood may be "shunted" through a glass tube without the formation of white thrombi which occurs in such experiments in the normal animal.[4] The success and safety of these experiments has led them to administer intravenous heparin to patients following operation[5]; 1000 units of heparin (10 mg. of the purified substance) are added to each 100 ml. of saline solution and the fluid given by the intravenous drip method at such a rate as will keep the coagulation time at three times its normal value. It is stated that "the injection is continued for varying periods up to fourteen days after the operation." Already 222 cases have received this treatment but no analysis of the results is yet available. CRAFOORD (1937) has recorded a small series of cases which showed that the injection was without danger and was not productive of a hæmorrhagic tendency. It is impossible to draw any conclusions, as MURRAY and BEST are careful to point out, until figures for a much larger series have been published. Since, however, deaths from pulmonary embolism after operation occur only about once in every thousand cases the therapeutic endeavour is bound to seem disproportionate to the results and only if almost complete success is attainable would post-operative injection of heparin be likely to become a routine practice. Of more practical importance, for the

[1] Jorpes, E., *Uppsala LäkFören. Förh.* 1937, **43**, 83.
[2] — Holmgren, H., and Wilander, O., *Z. mikr.-anat. Forsch.* 1937, **42**, 242.
[3] Wilander, O., *Acta med. scand.* 1938, **94**, 258.
[4] Best, C. H., Dowan, C., and Maclean, D. L., *J. Physiol.* 1938, **92**, 20.
[5] Murray, D. W. G., and Best, C. H., *J. Amer. med. Ass.* 1938, **110**, 118.

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moment, anyway, is the suggestion of heparinisation of patients following such operations as embolectomy. We publish elsewhere in this issue accounts of experiments in therapeusis which will have a far greater interest to clinicians, as they suggest the possibility that heparin might prove valuable in such serious and common conditions as coronary and cerebral thrombosis. HOLMIN and PLOMAN record an unusually favourable outcome of a case of thrombosis of the central retinal vein treated with heparin and in MAGNUSSON'S case of thrombosis of the posterior inferior cerebellar artery an equally satisfactory recovery was obtained. It is difficult to be convinced by MAGNUSSON'S report that heparin influenced the course of the illness. The negligible hæmorrhage from an accidental abrasion of the pharynx suggests that blood coagulation had scarcely been affected by the heparin. The observations on the bleeding time following injection of heparin have no practical significance; this substance is known to prolong coagulation by its action as an antithrombin and antiprothrombin but to have little effect on capillary hæmorrhage. Further, to argue that a normal bleeding time indicates that there is no undue liability to hæmorrhage is to virtually deny the existence of hæmophilia. MAGNUSSON has taken a gloomier view of the outlook in Wallenberg's syndrome than is usually held in this country and the course of his patient's illness does not appear to differ greatly from that observed where no specific therapy has been employed. It is to be hoped that evidence will be collected of the efficacy of heparin in the treatment of established thrombosis. Meanwhile its therapeutic possibilities cannot be assessed.

ANNOTATIONS

HOSPITAL TICKETS

SINCE Lord Sankey, in presenting the report of the voluntary hospitals committee to the British Hospitals Association conference last year, advocated a State grant through some procedure analogous to that of the University Grants Committee, there has been a movement of public opinion in its favour although no specific recommendation was included in the report. The Scottish Department of Health had already suggested that State assistance might be rendered in the form of a teaching facilities grant in recognition of the service rendered by hospitals in providing facilities for medical teaching. This accords with a practice well established in Scotland by which the medical student is required to provide himself with a ticket. The rule on the subject at the Edinburgh Royal Infirmary, for example, is as follows:

Every student visiting the wards, operating and pathological theatres, attending any clinical class in the Royal Infirmary, or acting as a clerk or dresser, must be in possession of a hospital ticket for the period during which he or she visits, attends, or acts.

A payment of this kind has been made since the earliest days of the Infirmary, two centuries ago. It may well account for some of the thoroughness of medical education in Scotland, since not only has the ticket-holder to record his attendance regularly but his parent or guardian would naturally desire to secure that the money is a profitable expenditure. The fee for a "perpetual" ticket has recently been raised to £18 from the 12 guineas at which it has stood for nearly one hundred years. In the last statement of account the amount received from this source by the Edinburgh Royal Infirmary was £5432. In a full year under the new regulation it will rise to about £8000. This provides an obvious basis upon which a grant could be made by the State through the University Grants Committee without encroachment upon the freedom of the hospital authorities. But before this practice could be extended by the committee throughout Great Britain it would be necessary for English hospitals to establish a similar procedure. Its adoption by the hospitals with medical schools in London would mean an addition of some £100,000 a year to their incomes, outside London an addition of £70,000 a year, taking as a basis the figures in the latest return of the University Grants Committee. No legislation would be necessary to carry out this arrangement which, if the medical schools agreed, could come into operation with the acceptance of each new student. The establishment of a uniform practice in England and Scotland would afford a basis for an approach to the Chancellor of the Exchequer for a corresponding grant from the Treasury to be devoted to that portion of the work of a hospital which benefits the whole community.

THE "SAFE PERIOD"

THE belief, held by H. Knaus, K. Ogino, and other advocates of the "safe period" method of birth control, that the period of fertility in the menstrual cycle can be accurately predicted has a three-fold basis. It implies first, that ovulation is an event which occurs spontaneously at a fixed time in each cycle; secondly, that the ovum is fertilisable for only a brief period; and thirdly, that the sperm is also short-lived. According to Stein and Cohen,[1] who have recently reviewed the problem, there is no reason for doubting the truth of the second and third of these propositions. They hold, however, that there is need for caution in accepting the theory that ovulation is a fixed event in the cycle. Their initial criticism of this theory is that several other workers have failed to confirm the observations by Knaus on which his conclusion that ovulation is a mid-interval occurrence largely rests—that the uterus is non-contractile during the second half of the ovarian cycle. Stein and Cohen are perhaps rather severe in this criticism, for while many workers have been unable to confirm Knaus's observations, others have obtained results in good agreement with them. Furthermore one must bear in mind the possibility that those patients who show uterine contractions in response to posterior pituitary injections in the second half of the menstrual cycle may not have ovulated in that particular cycle—for the occurrence of uterine contractions signifies only that the uterus was not at the time under the influence of luteal stimulation. Stein and Cohen appear to under-estimate this chance, for according to Mazer and his co-workers,[2] 30 per cent. of women who

[1] Stein, I. F., and Cohen, M. R., *J. Amer. med. Ass.* 1938, 110, 257.
[2] Mazer, C., Israel, S. L., and Kacher, L., *Surg. Gynec. Obstet.* 1937, p. 30.

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present no abnormality other than functional sterility may menstruate from a uterus which has not been affected by the luteal hormone.

This is not, however, Stein and Cohen's only criticism. While they accept the evidence that fertility in man is highest in the middle of the cycle, they hold that conceptions may also occur in the premenstrual and immediate postmenstrual periods. They accept also the view that ovulation may result, at times other than the middle of the cycle, from the stimulus of coitus. On the other hand, they disparage, perhaps unduly, evidence obtained from studies of the relation between intermenstrual pain and ovulation and of the condition of the ovaries and endometrium during the menstrual cycle. Some of this evidence, for example that supplied by Wharton and Henriksen [3] and by Rock and Bartlett,[4] has been very carefully sifted, and in our opinion certainly suggests that ovulation occurs in the middle of the cycle. Stein and Cohen admit that ovulation is probably a mid-interval occurrence, though they regard this as still unproven; but even if it is, they hold with many others that reliance on the "safe period" cannot be regarded as a practical contraceptive measure. Its main drawback according to them is the great irregularity and variability of the cycle [5] which makes it impossible to predict accurately the times of succeeding ovulations. This difficulty is of course recognised by all advocates of the "safe period" method of contraception. There are many clinical records which seem to show that it can be overcome. Records of failures may mean no more than that the method can be used with success only by a certain type of patient—perhaps only by women whose cycles are relatively regular, and who can be relied upon to abide by rigid rules. Meanwhile there are more reliable contraceptive devices for that large majority of the public whose principles allow of their use.

NURSERY SCHOOLS IN THE SPECIAL AREAS

THE Save the Children Fund Nursery Schools Committee is now responsible for ten nursery schools in distressed areas with accommodation for 545 children. In its fourth report, covering the period from May, 1936, to October, 1937, the present position is surveyed. The Commissioner for Special Areas has made substantial grants towards the cost of erection of some of these schools. He is precluded from aiding any enterprise which receives assistance from another Government department, and so cannot help with running expenses, but grants for maintenance are now being given by the Board of Education to all the committee's schools except the last one opened. A holiday school for the children in the special areas of Durham and Tyneside has also been acquired, a suitable building having been secured on advantageous terms at Haydon Bridge in the valley of the South Tyne. The committee is working in precisely those districts where nursery school conditions are at the same time most urgently required and most difficult to secure. The good work done by nursery schools in safeguarding the children's health is emphasised by one of the superintendents, who perhaps deduces rather too much from the happy circumstance that all the children in the second and third years at the nursery school escaped attack from epidemic prevalent in the district, only children in their first year being affected. The demand for nursery schools is constant: every school except the one most recently opened could be filled a second time from its waiting-list, and many requests for places come from doctors and welfare centres. The chief difficulty in the way of extension is a financial one. Special areas are too poor to provide much local support; the Board of Education grant does not become available until a school has been running for a year, and during that time the committee has somehow to find the whole of the upkeep. The value of the work is out of all proportion to the expenditure, and it is greatly to be hoped that the committee will acquire the independent income which will enable it to carry out much-needed expansion.

[3] Wharton, L. R., and Henriksen, E., *J. Amer. med. Ass.* 1936, 107, 1425.
[4] Rock, J., and Bartlett, M. K., *Ibid.* 1937, 108, 2022.
[5] See *Lancet*, 1937, 2, 1327.

PAIN IN CARDIAC INFARCTION

IT is established that acute myocardial infarction may occur without pain, but the proportion of cases in which it is absent and the nature of the symptoms which take its place are less certain. Absence of pain was found to be uncommon by J. A. Kennedy,[1] who took as his starting-point 200 autopsies in which cardiac infarction not less than 1 cm. in diameter was noted. Of the infarcts 109 were classified as old and 142 as recent, according to the pathological appearances and history; recent infarcts being diagnosed only when the history of the illness was not longer than 6 to 8 weeks. In 51 hearts there was both an old and a recent infarct. A certain number of patients had other conditions such as cerebral vascular lesions, severe diabetes, and cachexia, which obviously rendered them unsuitable as subjects for this study on the presence or absence of pain, and they were excluded. Among 86 cases of recent infarction there was definite pain in 91 per cent.; discomfort was noted in 4·3 per cent.; and neither pain nor discomfort in 4·3 per cent. In 102 cases of old infarct the percentages for these three categories were 63·7, 13·7, and 22·5 respectively. In this group were ten patients with histories of attacks of brief pain only—i.e., not more than a few minutes. The sensations classified as discomfort generally took the form of aching, tightness, or pressure in the chest, left arm, or abdomen. These results suggest a higher frequency of pain in infarcts followed by death—i.e., in the group of recent infarcts—than in the old ones. Kennedy believes, however, that the real differences may be less than the figures indicate, since in the second group the patient's recollection of his symptoms might be impaired by the lapse of time, and moreover the nature of the final illness may not have prompted a deliberate inquiry into this symptom. There seems no reason to doubt that a first infarction can be recovered from without producing symptoms which allow it to be diagnosed. On the other hand it has been observed that when infarction occurs in a heart which is already affected by an old one there may be no pain but congestive failure may develop, or previous failure be intensified.

THE YOUNG PRACTITIONER LEARNS HIS JOB

MEDICAL students often start their career by listening to an address designed to stimulate their interest in their future profession and their loyalty to the particular school which is preparing them to join it. Through the kindly offices of the British Medical Association they can now, if they choose, round off their curriculum by the same process. Last week an excellent discourse was provided for

[1] *Amer. Heart J.* 1937, 14, 703.

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their benefit by Sir Kaye Le Fleming, chairman of council of the Association.

Speaking as a general practitioner to many who would find themselves engaged in that, "the most highly specialised branch of medicine," Sir Kaye hinted at some of the dangers that beset their path, for which they were too little prepared. They must turn their attention, he said, from the narrow study of disease, its detection and cure, to the broader study of humanity and remember that while the doctor studied the disease the patient studied the doctor. At the beginning of their career they might not unfairly be regarded as mariners, who, having learnt in detail the construction of the different parts of a ship, are expected to put to sea without any lessons in navigation. For the sea of general practice is an uncharted sea, full of dangers, which are only learnt by those who sail upon it. And yet in the five years or more spent in fitting themselves for this kind of seamanship they received no help from those who are experienced navigators in this particular sea. The general practitioner had responsibilities to his fellows, to the State, and to the public as a whole, as well as to his own individual patients; and all these constituted his contribution to preventive medicine. He must nowadays be competent to give advice on social hygiene, milk, nutrition generally, industrial and occupational ill health, overcrowding, and the laws of physical and mental fitness. The newly qualified man has still much to learn, but it is encouraging to hear that in spite of criticisms of the curriculum Sir Kaye deems him to leave hospital better prepared for his work to-day than he was 40 years ago. A large audience of senior students and young practitioners listened to the discourse with obvious appreciation and enjoyed the film showing physical exercises that followed it.

THE MACHINE AND THE WORKER

A MAJOR problem of industrial civilisation is the adaptation of machines to the reasonable capacities and limitations of the human beings who have to work or feed them. The feeding of a machine may impose serious stresses upon the worker who has to keep pace with its requirements. He has to move in a uniform manner which conflicts with his natural habit, and when the machine compels him to go faster than his natural rhythm, his conflict is much greater. S. Wyatt and J. N. Langdon, with the assistance of F. G. L. Stock, have been investigating, as part of a general study of industrial methods, the problems of machine feeding, and their report[1] brings to light several facts which are often disregarded. They found that efficiency varied widely—between 52 and 86 per cent. of the maximum possible output—and that poor performance was due either to excessive involuntary stoppage or to failure to keep pace with the machine. There was some evidence that a machine will, so to speak, pull a tired operator after it, and that the desire to rest is largely satisfied by prolongation of machine stoppages. There may be an optimum feeding space and apparent rate of movement of the feeding mechanism for each worker. Perhaps the most important part of the investigation, however, concerned the likes and dislikes of the workers. Lists of items referring to possible sources of satisfaction and discontent were given to a number of workers to mark, and the percentages of the votes were worked out. The feature which most people liked best was "pleasant working companions." For repetition workers it is one of the most important sources of satisfaction, and without it many types of work would be almost intolerable. Half the witnesses valued the opportunity to talk, and in simple processes where conversation was particularly easy the proportion rose to three-quarters, but it fell to a fifth in the group working high-speed machines. Most of the workers seemed to be satisfied with the hours of work and payment, in the sense of having become adapted to those conditions. Interest was highest in comparatively varied work, and lowest when the chief characteristics of the process were uniformity and simplicity. Even slight changes in the type or conditions of work produced, however, important changes in the outlook of the workers. A feeling of competition appealed to more than one-third. The worst bugbears were "waiting for work" and "trouble with the machine," chiefly because they cut down the weekly wage. Next came monotony and noise, but the workers on the noisiest machines made the fewest complaints. The proportion of those who complained of fatigue varied much with the type of work: from 2 per cent. at a comfortable speed to 42 per cent. on fast machines. There was very little evidence that operatives like an "easy time"; these workers preferred work that lay between strain on the one hand and boredom on the other. Contentment is so closely related to rate of production that this study, though it is only introductory, ought to be of use to employers.

[1] The Machine and the Worker: a study of Machine-Feeding Processes. Medical Research Council: Industrial Research Board. Report No. 82. London: H.M. Stationery Office. Pp. 45. 9d.

THE FAMILIAL INCIDENCE OF MENTAL DEFECT

THE effective study of mental deficiency and its causation is no simple task. Although the books and papers on the subject extend to enormous proportions, even a superficial inspection of this mass of material shows not only how limited is our knowledge but what difficulties those encounter who seek to add to it. What, in fact, is mental defect? How is it to be recognised and defined? Is its degree susceptible of measurement? There can clearly be no satisfaction in confining attention to gross abnormality, the easier path taken by some of the early writers on the subject. If, as is becoming more generally accepted, intelligence is a graded character, like stature, with a continuous distribution in the community, there can be no hard and fast line drawn at all between the normal and the abnormal. A proper study of the problem must take into account the gradations of mental ability which will be found among both the patients themselves and their relatives. One hopeful line of approach is the study of the different clinical types identified among the mentally defective, partly by an application of general medical principles. Well-recognised diseases, however, are only found in a relatively small proportion of cases, though a number of little-known clinical abnormalities are associated with mental defect and this is not fortuitous. Even taking these into account there will always be a residual group of patients with no associated mental and physical disease, physically healthy but mentally inferior. The legal definition of defect is clearly not very helpful, being necessarily framed for administrative purposes and equivalent to a diagnosis of social incompetence. For scientific purposes intellectual inferiority is a more exact criterion.

Such considerations are sufficient to show that investigation of the causation of the different grades and types of defect must have a very wide scope. Statistics bearing on the problem can, and should,

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be approached and analysed in many different ways. With the hope of increasing existing knowledge on this difficult but important subject a scheme of research was planned in 1930 under the joint auspices of the Medical Research Council, the Darwin Trust, and the Royal Eastern Counties' Institution. The first investigation, it was decided, should comprise the clinical and genetic examination of a large series of mentally defective patients. The direction of this work was placed in the able hands of Dr. L. S. Penrose, whose report has just been published. His laborious study of a representative group of 1280 patients of all grades and types of mental deficiency, of their parents, their offspring, and their 6629 sibs (brothers and sisters) leads him to conclusions which are summarised on another page. Among the many significant points that emerged from this inquiry is that the incidence of defect among parents and sibs of patients was estimated as between 7 and 9 per cent., whereas in the general population it is only 1 to 2 per cent. It may be that comparison of these figures somewhat exaggerates the difference, since defective children of defective parents are perhaps more likely to be placed in an institution than those of normal parents. But even if this possibility is taken into account the difference remains striking enough to lend support to the movement for voluntary sterilisation, especially in view of the much higher incidence of mental defect among the patients' own children.

MARIE CURIE[1]

BORN in Warsaw in 1867, the youngest child of a Polish professor of physics, Marya Sklodovska was brought up in an atmosphere of family devotion, national oppression, and economic exigence. At school she gave ample promise of extraordinary ability, but poverty put a stop to any prospect of a university career and she was obliged to become a governess. But she was no ordinary governess. In addition to her routine duties which she conscientiously discharged, she appointed herself honorary schoolmistress to the illiterate village children and devoted her evenings to the study of such text-books, often outmoded, as the local library afforded. Unexpectedly came the chance to read for a degree at the Sorbonne. This involved lodging in a wretched garret on a pittance of forty roubles a month. Despite the physical hardships implied she passed first in the master's examination in physics in 1893, and second in mathematics a year later. After an early romantic experience which came to grief, she put aside all thought of matrimony until she met Pierre Curie, already a distinguished physicist and some years her senior. They married and so began a partnership which was to prove emotionally and intellectually perfect. As a result of more than four years' research together in a shed which served for a laboratory, they discovered first polonium and then radium. The fame which followed brought no happiness to either and the untimely death of Pierre in a road-accident was a blow to the surviving partner from which for a time it seemed that she could not recover. She was offered a pension which she refused; she could still work, she said. She was given her husband's chair at the Sorbonne. The Institute of Radium, with Marie at the head of the laboratory of radio-activity, was founded and completed in July, 1914. Then came the war and the patriotism which as a girl she had felt for an oppressed Poland re-expressed itself in a desire to help her adopted country. She organised a radiological service for the wounded and herself operated one of the mobile X ray units, the "Curie-cars" as they were called. With the end of the war she came back to the laboratory where she directed the researches of others and continued her own. There she remained until her death in 1934 from aplastic anæmia—due to the effects of radium.

These are some of the salient facts about the life of a woman said (by Einstein) to be "of all celebrated beings the only one whom fame has not corrupted." Her stubborn singleness of purpose and her pure scientific detachment made her shrink from publicity and indifferent to honours. Material wealth made no appeal to her and she found poverty no more than mildly inconvenient. Her passion for research and her capacity for work amounted to an obsession which, however, was magnificently justified by results. A biography by her younger daughter, sympathetically written and admirably translated, leaves the reader with a picture of an indomitable ascetic of great intellect and of a most engaging simplicity.

[1] Madame Curie. By Eve Curie. Translated by Vincent Sheean. London: William Heinemann. 1938. Pp. 411. 18s.

BLOOD POTASSIUM IN INTESTINAL OBSTRUCTION

A YEAR ago[1] we drew attention to some recent work showing that a rise in blood potassium constantly accompanied experimental intestinal obstruction in cats. These observations have now been extended to man and the same group of workers[2] have published a careful study of 25 cases of human intestinal obstruction. The results are a little ambiguous. Among 20 untreated cases the plasma potassium was found to be raised in 7 and lowered in 5. In some other cases the plasma potassium was found to be raised even after considerable quantities of saline had been given so that it was probably higher still before treatment. Figures are supplied for the potassium content of many of the secretions and body fluids in patients with intestinal obstruction. These observations are of considerable interest, and constitute a real advance in knowledge; but it is clear that a rise in serum potassium need not necessarily accompany intestinal obstruction. A glance over the authors' tables shows that the serum potassium was not raised in a number of the fatal cases and *was* raised in some of those which recovered. Nevertheless the conclusion reached by the authors—that disturbances in blood potassium explain some of the symptoms found and the procedures used in intestinal obstruction—is probably justified.

THE RESTORATION OF HISTOLOGY TO ANATOMY DEPARTMENTS

WE note with interest that the teaching of histology in the University of Leeds is to be transferred from the department of physiology to that of anatomy. The university has good precedent for this administrative change, for a similar one has already been effected in several of the leading medical schools in the country. Some schools still hold out against a rearrangement that certainly seems logical, on the grounds that the teaching of histology has long been associated in this country with that of physiology, and that transference of its control to another depart-

[1] *Lancet*, 1937, 1, 639.

[2] Scudder, J., Zwener, R. L., and Whipple, A. O., *Ann. Surg.* 1938, 107, 161.

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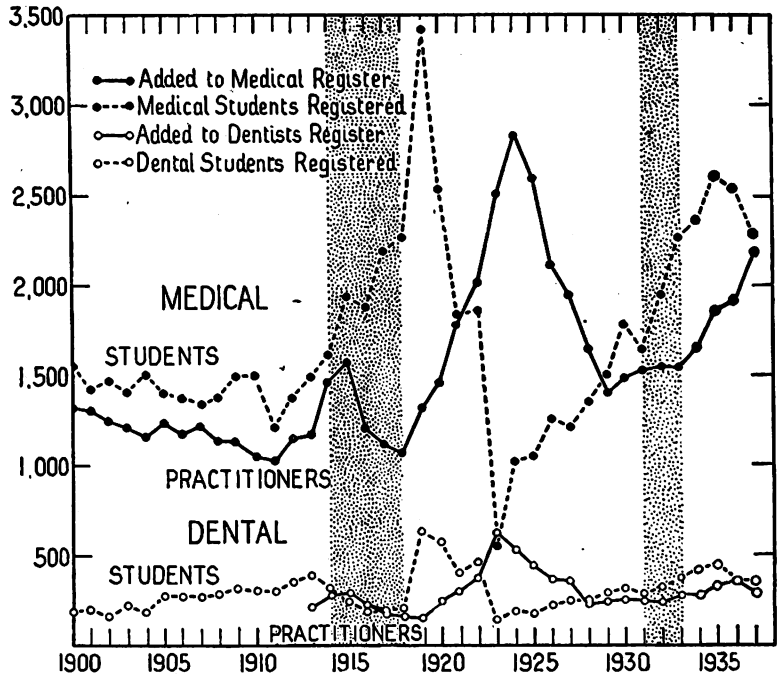
ment might lead to undesirable changes in the type of histology taught. While all will agree that histology is of little importance if considered apart from questions of function, the same applies to the teaching of anatomy of any kind, gross or minute, to students of medicine. On the Continent and also in America the association of histology with anatomy has been the accepted rule. It cannot fairly be claimed that the subject of histology is in a more flourishing and vigorous state in England than it is in the United States or in continental countries. The inclusion of histological teaching, and of such histological research as teachers find time for, in the departments of physiology in England is to some extent accidental. It arose from the fact that physiology was first separated off from anatomy and made the subject of a separate chair at University College, London, at a time when the last of the professors of anatomy and physiology, William Sharpey, was known chiefly for his work as histologist and physiologist. It was not unnatural, therefore, that at the time of the partition histology should drift into the physiological laboratory. It was welcomed there then because the teaching of histology required relatively simple apparatus and equipment, and provided something definite in the way of a practical course of instruction, comparable with that already provided on the anatomical side by the dissection of the cadaver. With the subsequent large growth and development of experimental physiology, including experimentation on the human volunteer, together with the vast expansion of physiological chemistry, the difficulty in filling up the hours devoted to practical work in physiology was removed. Nowadays many physiologists find that the teaching of histology in their departments robs them of time which could be better used in the performance of experiments of some kind or another. It is perhaps not without significance that University College was also among the first medical schools in Great Britain to restore the teaching of histology to its anatomical department, a change effected as long ago as 1923.

THE 1938 REGISTERS*

THE official registers tell a simple story. The entry of medical students began to fall in 1935 and fell more sharply last year. The number of names added on qualification to the Medical Register still continues to rise from year to year and will so continue for a while, corresponding to the 1935 peak of student entry. Every section of the Medical Register shows an increase. In England 176 more names were added than in the previous year; in Scotland 103 more; in Ireland 16 more, and in the Colonial section 13 more. The total number added is 2214, to equal which we must go back as far as 1925, and the number of names on the Medical Register on the last day of the year exceeded 60,000 for the first time. The drop from 2544 to 2297 in the number of medical students registered during the year was due principally to a fall of 198 in the entries in the English schools—there were 57 fewer medical students in Scotland, but 8 more in Ireland; indeed a noticeable feature of the student entry is the constancy of the numbers in Ireland during recent years. The dental figures tell a different tale, as indeed might be expected when the adjustment has been left so much less than in the case of doctors to the simple law of supply and demand. The Dental Board of the United Kingdom has relaxed no effort to keep up the numbers in the Dentists Register, but in spite of this there was a sharp drop last year in the new entries from 355 to 299, the entry of dental students also falling but to a much lesser extent. In fact, practically speaking, the dental student entry was the same as in the previous year. The tendencies we have mentioned can be seen on the graph which has been brought up to date.



* The Medical Register for 1938 (21s.), The Medical and Dental Students Register for 1937 (7s. 6d.), The Dentists Register for 1938 (12s.). All published for the General Medical Council by Constable and Co., Ltd.

Major RODERIC DUNCAN CAMERON, M.C., R.A.M.C., has been transferred from the Directorate of Medical Services in India, where he has been since April, 1935, a deputy assistant director, to the War Office as deputy assistant director-general, Army Medical Services.

ON March 22nd and 24th at 5 P.M. Dr. J. A. GREENFIELD will deliver the Oliver-Sharpey lectures to the Royal College of Physicians of London. He will speak on recent observations on the morphology of the neuron, and the changes which it undergoes in disease.

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SPECIAL ARTICLES

MEDICAL RESEARCH COUNCIL
ANNUAL REPORT FOR 1936-37*

FROM their inception it has been the policy of the Medical Research Council to combine two main methods of supporting medical research. They have maintained their own central laboratories, the National Institute for Medical Research, where a permanent whole-time staff could pursue uninterrupted investigations under the best possible conditions; and they have made grants in aid of research work throughout the country in institutions which are linked with university teaching or hospital practice. An intermediate type of arrangement has, however, gradually developed under which appointments are made to individual members of the Council's staff for work in certain hospitals and elsewhere. This plan is obviously essential for clinical researches demanding hospital facilities. The Council have not only established a number of special units for clinical work but they have supported a unit of pathological work at a maternity hospital for the study of puerperal infections, while elsewhere in this issue (p. 686) reference will be found to the investigations made by a member of their staff in an institution dealing with mental defect. Different reasons have influenced the allocation of workers to various places. For example, work on the bacteriology of tuberculosis could best be conducted in close association with agricultural research on this disease in animals. Sometimes the choice of a centre has been determined by previous activity there in a particular subject, or by the presence of some senior worker whose directing influence was deemed of special value. In this way appointments for work on nutrition have been made at the Lister Institute and at Cambridge, and a special department for the study of bacterial chemistry is maintained at the Middlesex Hospital. In view of this development a new section has been introduced into this annual report giving a separate account of the work of those members of the external staff whose range of activities is not described in other sections under special headings.

A Move to Mill Hill

The need for additional laboratories for pursuing new work on chemotherapy mentioned below, as well as for that on biological standards and nutrition, has led the Council to an important decision regarding the site and buildings of their central institute. Its present site at Mount Vernon, Hampstead, is deemed unsuitable for further development on the scale now in view, even without allowing for future expansion. Furthermore, the main building there, originally a hospital and a dwelling-house, is neither modern nor ideally suited to its present functions. Provision for eventual demolition and rebuilding would thus have to be included in any scheme of development there, and the question has arisen where such provision could most profitably be made. The Council have possessed since 1922 thirty-nine acres of farm land at Mill Hill, where it was originally intended to carry out work which could not conveniently be done at Hampstead. It has already been found necessary to make much greater development at Mill Hill than was expected and if the buildings now required are built there the work of the various departments of the National Institute will be divided between two main sites rivalling each other in importance. This is regarded as undesirable, and the Council have decided to abandon the Hampstead site and concentrate the whole of the National Institute at Mill Hill. This will have the advantage of providing close contact and opportunities of collaboration between different departments and the convenience of common services. Proximity to the new main laboratories of the Imperial Cancer Research Fund, which are on adjoining land, should also be a source of mutual benefit.

Research in Chemotherapy

Mention was made last year of the government's intention to provide the Council with an additional £30,000 a year for the development of research in chemotherapy. The new grant has now become effective, but before actual investigation can be started the income of at least the first twelve months will have to be spent on buildings and equipment.

Chemotherapy in the narrow sense of the word consists essentially in the administration of chemical compounds synthesised in the laboratory and found to have specific actions on the infective organisms causing particular diseases; but in a wider sense the term includes the discovery of chemical substances having specific actions on certain bodily functions. Such drugs as aspirin, Avertin, and Percaine, for example, would fall into this category. The principal successes with chemotherapy in its restricted sense have so far been in infections with spirochætes and protozoa rather than with bacteria, but recent work with Prontosil in its different forms and sulphanilamide has opened up new ground which is being rapidly and effectively developed. Although several fundamental discoveries in chemotherapy have been made in this country, it is remarkable that the discovery and production of chemical compounds of therapeutic value depended almost entirely on German science and industry, and still so depends. Were the matter only one of prestige, the situation would be serious enough. But since when foreign firms have spent large sums of money to perfect a remedy, they naturally expect to derive substantial profit from its manufacture, they try by patenting processes and by refusal to grant licences to prevent its being made in this country. As things are the British Empire might, in case of war, be deprived of essential drugs. There is, then, strong reason for developing a national scheme of investigation here which will be not unworthy of comparison with the work done abroad. The financial requirements of such a scheme are too large to be met from ordinary resources. Research in this field is largely empirical and involves the production and testing of an almost infinite number of different substances. In Germany investigations have been mainly made by manufacturing firms employing hundreds of chemists, but the larger chemical firms in Great Britain have not appeared willing to use their resources in this manner; thus if this country is to play its proper part in chemotherapy there must be a national scheme supported from public funds.

The Council have long supported research in chemotherapy both at the National Institute and in various university centres, and for this purpose have collaborated with the Department of Scientific and Industrial Research at their laboratory at Teddington. The practical results obtained have

*Report of the Medical Research Council for the year 1936-37. London: H.M. Stat. Office. 1938. Cmd. No. 5671. Pp. 195. 3s.

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been by no means negligible. In the last few months, for instance, what promises to be an important new series of remedial agents for trypanosome infections has come to light through a research in which Mr. H. King, D.Sc., of the National Institute has coöperated with Prof. Warrington Yorke and Dr. E. M. Lourie of the Liverpool School of Tropical Medicine. Starting with the synthetic base Synthalin, which was introduced some years ago as a substitute for insulin, they have investigated the trypanocidal properties of a large series of related bases, and have found one member of the series with as powerful a trypanocidal action as synthalin but a lower toxicity for the mammalian host.

Notwithstanding these and other results obtained in Great Britain this sort of work has clearly called for further expansion. In the absence of effective coöperation by industry, it was held that an essential factor in a national scheme would be a central laboratory with a staff able to give their whole time and thought to chemotherapy and providing opportunity for the close daily association of biological investigators with those engaged in the synthetic production of new compounds. The scheme would follow the general line of action of a great commercial organisation, with the extremely important difference that a commercial scheme aims solely at remunerative success and may even suppress valuable scientific information incidentally obtained; whereas a publicly supported scheme would be certain to produce material of much more than immediate value for the theoretical basis of the whole problem.

Sulphanilamide and Allied Substances

The great value of prontosil was first made apparent by its use in the treatment of puerperal sepsis by workers at Queen Charlotte's Hospital, headed by Dr. Leonard Colebrook of the Council's staff. The work has been continued, both with red prontosil and with sulphanilamide, and the good results in the treatment of infections of childbirth are well maintained. Possibly the first general indication of the public benefit initiated here is the reduction of the death-rate from puerperal sepsis in London from an average of 1·57 per thousand births between 1930 and 1935, to a figure of 0·75 in 1936. Spectacular results have also been obtained in other streptococcal infections, particularly in erysipelas and streptococcal meningitis, and more recently there have been indications of their curative effects in infections by meningococci, typhoid and other coliform bacteria, by dysentery bacteria, and, less impressively, by pneumococci and staphylococci. The sulphanilamide compounds bid fair to replace mandelic acid in the treatment of *B. coli* infections of the genito-urinary tract, as they are equally effective and more simply administered. From the standpoint of public health perhaps the greatest importance attaches to the reports of the curative effect of these compounds in acute and chronic gonorrhœa of both sexes.

A powerful remedy of this kind must be used with care and discrimination. Chemotherapy exploits the margin between the lethal effect of a drug on the invading micro-organism and its toxic action on the patient. In some circumstances, with particular preparations of the drug, or in certain patients the margin may be narrower than usual, and reports of ill effects of the use of compounds of the sulphanilamide group have not been wanting.

Influenza

In December, 1936, there began the first widespread epidemic of influenza in this country since that of 1933 which gave the opportunity for the first demonstration of the virus by transfer to the ferret. During this 1936–37 epidemic the characteristic virus was found in throat washings from no less than 30 out of 40 cases of typical uncomplicated influenza. In the early stages of the epidemic some six hundred soldiers and a hundred civilians were vaccinated with the inactivated virus in groups, each group being matched by an equal number of controls. The results were inconclusive, but it can be said with certainty that the vaccination did not give protection in all cases, even when it had a good chance. This lack of success becomes more intelligible and less discouraging in the light of recent advances in knowledge of the viruses from different epidemics. In December, 1936, Magill and Francis of the Rockefeller Foundation demonstrated a clear immunological difference between two strains of the virus obtained from different human epidemics, and this observation was later confirmed by C. H. Andrewes and Wilson Smith at the National Institute. Strains from various sources are now being studied and appear to fall into several immunologically distinguishable groups. In particular the original strain obtained from the 1933 epidemic, which was used for the preparation of the vaccine for the recent trial, is found to fall into a different group from those that occurred in the 1936–37 epidemic. If vaccination is to be successful it will probably be necessary to choose an inoculum made from a virus of the same group as that responsible for the immediate outbreak. Andrewes and Wilson Smith have found that normal ferrets can be infected with the virus with great regularity by merely placing them in contact with others already infected, and that vaccination with the same strain of virus will effectively protect the ferrets from such contact infection.

Egg-membrane Cultures

One of the chief obstacles to the investigation of the filter-passing viruses has been the failure to grow them in ordinary culture media, and research has therefore depended on constantly repeated passage from animal to animal. In 1931 Goodpasture and Woodruff showed that the chorio-allantoic membrane of the developing chick, which had been used since 1911 by Rous and Murphy for the study of fowl tumours, could be infected by various viruses, and that these could be propagated there indefinitely. As a result developing eggs can now often be used to replace experimental animals. Fertile eggs are comparatively cheap and require little attention, and moreover they reduce to a minimum the risk of accidental cross-infection—the bugbear of the study of virus diseases in experimental animals. In recent work published by the Council F. M. Burnet has shown that on prolonged passage from egg to egg influenza virus, while remaining virulent for the egg-membrane, loses its virulence for the ferret and mouse, and yet preserves its immunising properties. If these characteristics can be perpetuated, which is by no means certain, the value of such a strain for the immunisation of man is obvious.

Surgery of the Heart

The recent work of Laurence O'Shaughnessy on the surgery of the heart illustrates well the development of a technique along systematic experimental lines. O'Shaughnessy set himself the problem of supplementing the cardiac blood-supply in cases where there were symptoms of vascular obstruction caused by diffuse disease of the vessel walls. First, he studied the natural processes of repair and

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compensation which often occur in coronary occlusion in man; secondly, after ligaturing some of the blood-vessels to the heart muscle in animals, he grafted and sutured living tissues to such hearts and studied the new blood-supply which resulted; thirdly, patients with an inadequate blood-supply to the heart as the result of coronary occlusion were subjected to similar operation, and new blood-supplies were established by grafts of living tissues. In 1931 O'Shaughnessy used grafts of the omentum in the repair of wounds of the œsophagus, and from this it was but a step to applying the graft to the surface of the heart. In animals it could be demonstrated that the presence of such a graft was compatible with normal function of the heart and lungs, and that, despite the foreign environment in which the omentum now found itself, its property of forming new blood-vessels remained unimpaired. The first patient was subjected to the new grafting operation (cardio-omentopexy) in January, 1936, and since then twenty further patients have been operated on in the Lambeth Cardiovascular Clinic of the L.C.C. There have been five deaths but the survivors of the earlier operations were all improved, and some formerly bed-ridden are now leading a normal life.

Salt Deficiency

Although the great importance of an adequate supply of sodium chloride in the body has long been realised there has hitherto been no clear understanding of the results of shortage of this substance. Dr. R. A. McCance, Miss E. M. Widdowson, and others, working with the support of the Council at King's College Hospital, set themselves to bring about a state of salt deficiency in normal persons severe enough to reproduce the conditions found in disease. Volunteers were given a diet containing practically no salt and were made to sweat profusely every day in a hot air chamber. After four to eight days most of them were reduced to a state of nausea, lassitude, and fatigue, sometimes accompanied by breathlessness on the least exertion. These symptoms closely resembled those of Addison's disease and the chemical changes in the blood were very similar. There was a reduction in the volume of the blood and extra-cellular fluids and interference with the normal action of the kidneys with accumulation of the products of nitrogen metabolism. These findings explain the importance of a generous supply of salt to workers in hot atmospheres such as deep mines and metal foundries, and also the need for abundant salt in the tropics. In this connexion it is of interest to note the function of the potassium ion in influencing the transmission of the nervous impulse both through the ganglionic cells and at myoneural junctions, recently disclosed by the work of Dr. G. L. Brown and his colleagues at the National Institute.

Nicotinic Acid

The career of nicotinic acid has been a chequered one and it forms another example of how an apparently trivial discovery of to-day may lead to one of great practical importance to-morrow. Twenty-five years ago Funk obtained this substance from rice polishings in his efforts to isolate the anti-beriberi accessory food factor and found it inactive in this respect. In 1936 it was shown by Lwoff and Lwoff and more definitely by B. C. J. G. Knight at the Middlesex Hospital to be an essential constituent of nutrient media for the growth of certain micro-organisms. In the past few months Elvehjem and his co-workers at Wisconsin University announced that nicotinic acid cured "black-tongue" in dogs, a condition which has come to be regarded as closely similar to pellagra in man. More recently Harriette Chick, T. F. Macrae, Sir Charles Martin, and A. J. P. Martin have found that pigs fed on maize and specially purified casein, on which diet they lost weight, developed diarrhœa, and died, could be cured by the injection of nicotinic acid or by adding this substance to their food. It remains to apply this discovery to the treatment of pellagra in man. It seems likely that nicotinic acid will prove to be an effective preventive and curative agent in this disease, but whether it is the only one is problematical. If it should prove to be the elusive pellagra-preventing factor, its place in nutrition is of the first order.

Cholera and Leprosy

Although the cholera vibrio has long been accepted as the causal organism of Asiatic cholera, its recognition has been coupled with doubts as to the best means of differentiating it from harmless vibrios found in man, in animals, and elsewhere, and it has been clear that an improvement in the diagnostic agglutination test for *V. choleræ* would be an important step towards the solution of these problems. In studying this test Mr. Bruce White of the National Institute found that the somatic or "O" antibodies alone possessed diagnostic specificity, the flagellar or "H" antibodies causing clumping also of the majority of vibrios from non-cholera sources. Dr. A. D. Gardner at the Standards Laboratory at Oxford reached a like conclusion. There was thus a prima-facie case for believing that O antibodies, evoked by antigens in which the non-specific H component had been inactivated, would effect a far sharper and truer differentiation of the cholera vibrio than sera of the mixed character hitherto employed. Recently consistent results in the recognition of *V. choleræ* have been obtained with adequately tested O sera.

The problem of leprosy has not received hitherto the close scientific investigation which it deserves largely because the causative bacillus had not been found to infect any of the lower animals which could be used for experiment. In their last report the Council referred to S. E. B. Balfour-Jones's success in transmitting the bacillus of rat leprosy to Syrian hamsters, and when Prof. S. Adler of the Hebrew University in Jerusalem visited the National Institute last year it was suggested to him that when he returned to Palestine he might try to infect these small rodents with human leprosy. This he has done and has found that the human bacillus readily infects the hamsters and produces in them a characteristic disease. These results if confirmed may provide the basis for an experimental attack on human leprosy by chemotherapeutic methods.

Comparison of this report with its predecessors shows an increasing preoccupation year by year with problems which have a direct bearing on clinical practice. Often it is apparent that the way had first to be cleared by experimental research; but a stage has evidently been reached in many branches of the work subsidised by the Council where more intimate collaboration between experimental and clinical workers has become practicable. We shall have further occasion to comment on different aspects of the fine work summarised in this report, which is as usual a model of convenience in format, style, and arrangement. Those who own to a prejudice against government publications should overcome it this year and spend three shillings on this one in the certainty that to anyone interested in the advance of medicine from whatever point of view it will prove enthralling.

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MENTAL DEFECT

A CLINICAL AND GENETIC STUDY

THE first investigation undertaken under a scheme of research planned in 1930 of which the aim is to increase our knowledge of the causation of mental deficiency has now been completed.[1] Dr. L. S. Penrose has examined a large series of patients and has graded them according to their mental condition, studying also their family history and the mental capacity of their parents, relatives, and offspring.

The material for this study, which took approximately six years to collect, relates to 1280 patients admitted to the Royal Eastern Counties' Institution. The mental grades of all these patients were estimated by mental tests whenever possible; in cases of physical disability and very severe defect the mental age had to be estimated roughly by other means. Care was taken to grade each according to his abilities and not always to accept the legal definition of his state. From these measurements four defined groups of mental ratios were compiled as follows: 70 or above, dull, or within the range of normality, but liable to certification as feeble-minded when their behaviour is anti-social; 50–69, simpletons, usually certified as feeble-minded; 20–49 imbeciles; and 0–19 idiots. The family of each one of these patients was visited several times by members of the research staff and after all the available information about the family had been collected in this way, and from many other sources, an assessment of mental capacity was made for each relative. Indeed many children and adult members of the families were themselves tested. In this way reliable information was obtained about all the near relatives of 920 of the patients and the mental ability could be assessed in a large proportion of them. We have thus two pieces of information to collate—the mental category of the patient and the mental categories of his near relatives.

Mental condition of parents.—Of the parents of patients 7·6 per cent. were themselves mentally defective—i.e., were considered to be of a grade equivalent to or lower than that of the patients termed simpletons, 13·7 per cent. were dull (as defined above), three-quarters were normal. The proportion of feeble-minded parents was largest (12·1 per cent.) among the patients termed simpletons, least (2·7 per cent.) among idiots. In the general population the estimated proportion of defectives is only about 1 per cent., though in rural areas it may approach 2 per cent. In making a comparison between this standard and the incidence of 7·6 per cent. in the sample investigated, there is, of course, the risk of some exaggeration, in that defective children of defective parents may well be more readily placed in an institution than the defective children of normal parents.

Mental condition of offspring and sibs.—The offspring of patients in the series were too few to provide much data, but of 124 such children 56 lived long enough for their mentality to be fairly accurately determined. Amongst these there were 23 mentally normal, 16 dull, 11 simpletons, 3 imbeciles, and 3 idiots, in total a heavy percentage of abnormals. Sibs of patients formed a very much larger group, 6629 being ascertained. Of these 1 per cent. were of superior intelligence, 55 per cent. were normal, 7 per cent. dull, 7 per cent. defective. Of the remaining 30 per cent. 14 had died in infancy, 13 were stillbirths or miscarriages, 3 were untraced. It is of interest that the largest proportion of idiots is found among the sibs of idiots, that imbeciles occur most frequently among the sibs of imbeciles, simpletons among the sibs of simpletons—a clear correspondence between the grade of defect in the patient and the grade of defect discovered in the family. The amount of defect found in the grandparents of patients did not differ from what one might find in the general population but the available material is not very reliable. In general the incidence of defect is shown to vary directly with the degree of relationship.

CLINICAL ABNORMALITIES

In the second half of the report attention is turned to the clinical diagnosis. A very large proportion of the patients (972, or 76 per cent.) exhibited some clinical abnormality. For each group the mental grades of patients and relatives can again be defined. For example the families of *mongols* showed a much lower incidence of defect than that found for patients in general. Although the condition is usually thought to be distributed sporadically, this investigation revealed a number of familial cases, an observation which suggests that a genetic factor may be concerned in addition to the recognised importance of maternal age at birth of the child. *Cretinism* also, the results suggest, may be sometimes the expression of a Mendelian recessive character, although endocrine disturbance in general is not. A detailed examination of the sibships of *syphilitic* patients gives figures of interest. Before the mother's infection the children were usually normal; then came a wave of offspring dying in infancy, followed by the birth of the mentally defective patient; the next pregnancy was liable to yield a child of impaired mental powers and soon afterwards normal children would again predominate. This and other lines of inquiry point consistently to the conclusion that congenital syphilis can be a cause of mental retardation. *Epilepsy* was found to be one and a half times as common among relatives of epileptic patients as among patients' relatives in general.

CONCLUSION

Broadly speaking we find, therefore, from this very careful work first that mentally defective relatives of a patient resemble the patient in grade more often than would be expected if differences in grade were fortuitously distributed, and secondly that the disease of the patient also exhibits a familial concentration. Evidence in favour of Mendelian recessivity is found in phenyl ketonuria, cerebromacular degeneration, cretinism, deaf-mutism, microcephaly, and congenital diplegia. Dominance is observed in epiloia, neurofibromatosis, and Huntington's chorea. With most other physical abnormalities, and with the psychopathological states, evidence in favour of hereditary influences lies in their familial concentration, though, clearly, this is not decisive evidence. The probable existence of environmental causes of mental defect is demonstrated in mongolism, congenital syphilis, trauma, and encephalitis. In some instances environmental and genetic influences appear to act in unison.

Finally, for the benefit of those who are not satisfied with the author's novel approach to the problem or with his statistical analysis—and they should be few—the complete family histories are provided in an appendix of some 80 pages.

[1] A Clinical and Genetic Study of 1280 Cases of Mental Defect, *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 229. H.M. Stationery Office. 1938. Pp. 159. 2*s*. 6*d*.

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MEDICINE AND THE LAW

Scarlet Fever as an Accident

A NURSE in an infectious diseases hospital has succeeded in recovering under the Workmen's Compensation Act for personal injury—namely, the contracting of scarlet fever while nursing at the hospital. The earlier stages of this case in the West Hartlepool county court were discussed in THE LANCET of Jan. 29th (p. 286). The applicant had suffered from arthritis and heart trouble as the result of the fever, and the judge has awarded full compensation at the rate of 20*s.* 3*d.* weekly from Nov. 12th to Dec. 12th, 1937, and subsequently 10*s.* 6*d.* a week on the basis of partial incapacity.

The case is of importance to hospitals and is of interest as reaching a decision contrary to that in Martin *v.* Manchester Corporation in 1912. In Martin's case the applicant was a porter in a scarlet fever hospital. He had influenza and returned to work. Nine days later, on April 1st, he was in the scarlet fever ward and also cleaned out the mortuary for the first time since his return. A few hours afterwards he was ill, and on April 5th he was found to have scarlet fever. He claimed that heart affection and nephritis followed the scarlet fever and that these disabilities were an injury by accident arising out of his work. The county court judge decided in his favour, accepting the view that Martin contracted scarlet fever when cleaning out the mortuary on April 1st. The respondent corporation appealed on the ground that Martin had not proved the day, circumstance, and place of the accident. It was not certain, said the appellants, that Martin contracted the fever in the hospital. In the Court of Appeal reference was made to two earlier decisions. Broderick *v.* L.C.C. (1908) was a case where a workman was held not entitled to compensation for enteritis ascribed to the inhaling of noxious gases in a sewer; Eke *v.* Hart-Dyke (1910) was a similar instance of poisoning ascribed to sewer gas where the work consisted of emptying out cesspools. Lord Cozens-Hardy, Master of the Rolls, asked himself this question: Is it or is it not the law that under this Act every hospital nurse or hospital attendant who contracts fever is entitled to say "I have suffered an injury by accident in the course of and arising out of my employment which entitles me to compensation"? "Emphatically I say 'No'," observed the Master of the Rolls; "there must be something more than that." The workman cannot recover compensation unless he can satisfy the court of the place and circumstances in which the illness was contracted.

The Court of Appeal found no proof that the body of any scarlet fever patient was in the mortuary when Martin was there on the day when the county court judge held that the scarlet fever had been contracted. The supposed infection on that day might be extremely probable; but it was not enough to say that, of the many chances Martin had of picking up the infection while working in the hospital, this was probably the one occasion when it happened. He was living in the fever hospital, working in the fever ward, and absent from time to time on leave elsewhere; there was nothing to show what was the particular occasion of infection. Lord Justice Buckley, in concurring, added that it was not enough to say "I was in a place where there was scarlet fever and I had scarlet fever and therefore I contracted it by accident." An accident was something more than the contracting of a disease. The workman must show how he contracted it. In the recent West Hartlepool case the county court judge has expressed himself as satisfied that the nurse contracted her scarlet fever in the hospital. She had entered upon her duties in the fever ward on Oct. 1st, 1936, and was found to be suffering from scarlet fever on Nov. 16th. How far the court specified the exact time and circumstance of the infection does not appear from the reports of the case at present available.

Unjustified Litigation

A fortnight ago at the Hampshire assizes there was a typical action of negligence against a doctor which, although ending in a rejection of the plaintiff's claim, must have caused considerable worry to the defendant. Mrs. Sprawton, conducting her own case, claimed damages against Dr. A. M. Dunlop on the ground of unsatisfactory treatment. She had met with an accident in leaving a Southampton tramcar when the road was under repair and had injured a leg and an arm. She did not send for the doctor at once, but, after staying in bed five days, went to see him. He advised the application of camphorated oil to her arm, she said, but he ignored the treatment of the foot. He had given her excellent attention on other occasions but this time she felt that she had cause of complaint. The only satisfactory treatment she had received was from a bone-setter. In her evidence she said she had obtained £21 damages from the Southampton Corporation but would have obtained more if Dr. Dunlop had been more careful in his diagnosis. In cross-examination she agreed that the accident occurred in October, 1926, and that the defendant had been her family doctor for 17 years and had treated her for various complaints, but she denied that she had been treated for acute rheumatism in the legs. She called two medical practitioners, each of whom, on entering the witness-box, raised the question of his fee. The judge explained to Mrs. Sprawton that the witnesses were entitled to be paid a professional fee before giving evidence and to refuse to be sworn if not paid. One of these witnesses said he had attended the court for four days and three guineas for each day was the least he could accept. The plaintiff was not in a position to pay this fee. The judge, after observing that it was extremely invidious to say what was a reasonable fee, said that he gathered that the plaintiff wanted to ask the medical witnesses what they found when they examined her and what treatment they recommended. Mrs. Sprawton then said she did not think their testimony would help her. Her daughter-in-law gave evidence that, before the accident, Mrs. Sprawton could walk well and had perfect health. This closed the case for the plaintiff and the judge naturally told the jury that, if they agreed there was no case against Dr. Dunlop, they should say so at this stage. The foreman said the jury would like to hear Dr. Dunlop's point of view. Dr. Dunlop said that this was the first time he had heard any suggestion of a fracture of the shoulder. Another witness, Mr. H. T. Nightingale, F.R.C.S., said he saw an X ray photograph; there was no fracture of the right shoulder and no fracture of the left foot. The jury found that there was no evidence of neglect against Dr. Dunlop. The judge, remarking that he felt bound to say he agreed, entered judgment for the defendant with costs. While we must all wish that every plaintiff, especially one who conducts her own case, shall feel that she has had a fair trial of her claim, this would appear to be one of those claims which should never have been allowed to harass a medical practitioner.

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IRELAND

(FROM OUR OWN CORRESPONDENT)

SALARIES IN THE POOR-LAW MEDICAL SERVICE

DISCONTENT among poor-law medical officers on the ground of the inadequacy of their salaries is not a new feature in Irish medical affairs, and it becomes specially noticeable in any time of economic depression. The medical officer gets a salary of £200–£350 a year for attendance on the sick poor of his district. But of this he has to pay his travelling expenses; moreover, he has to reside in the dispensary residence for which the rent is often unduly high. He is expected to earn the remainder of a livelihood from such private practice as may come his way. In a good district and when "times are good" for the farmer he may have a comfortable, though rarely a large, private practice. In a poor district and when times are bad the private practice may be almost negligible, for many of those who would ordinarily pay the doctor's fees find it necessary or attractive to seek his services as "poor persons" and without fees. In some cases his income almost disappears for the larger the number of "poor persons" whom he has to attend the greater his travelling expenses.

The only remedy for the recurring discontent in this essential public service is that which the profession has long demanded—the establishment of a State or national medical service. This solution has been recommended by repeated Government commissions and committees any time during the last thirty years, but every Government has fought shy of it. At present the Irish Free State Medical Union is pressing claims for improved and uniform scales of salaries for the dispensary officers, and some weeks ago a memorandum setting out their case was submitted to the Minister for Local Government and Public Health, but he saw no useful purpose in receiving a deputation. Failing getting direct access the dispensary group of the Union has issued a circular letter to all members of the Dáil asking for their help in procuring a better scale of salaries. The claim is based on (*a*) increased work; (*b*) the lower salaries for dispensary medical officers than for other officers of local authorities; (*c*) increases in rent for dispensary residences; (*d*) decrease in private practice; and (*e*) the increased cost of medical education, including the post-graduate work necessary for a dispensary appointment.

A suggestion was recently put forward by the county medical officer of Meath, Dr. T. F. O'Higgins, which if adopted would do something to relieve the present dissatisfaction. The poor-law medical officer, in addition to his duties as medical attendant on the sick poor, is also, by virtue of his appointment, medical officer of health for his district. Formerly he was the sole officer in country districts, but the county medical officers of health who have since been appointed have a superior authority. For their duties in this capacity the dispensary officers receive a very small salary, varying from £10 to £30 a year. Many attempts have been made in the past to standardise these salaries at a reasonable figure, but the local authorities have been unwilling to pay more, and the Department of Local Government and Public Health has not been encouraging. Dr. O'Higgins has suggested that the salaries should be standardised at £100 a year, and that it should be the duty of the district medical officer to undertake such duties as immunisation against diphtheria and such other ancillary work as he might recommend to the local authority. The proposal has attracted both the local authority of county Meath and the medical profession of the county. If it were to receive general approval throughout the country it would do away with the present unpleasant impasse regarding payment for immunisation, and would make a substantial improvement in the emoluments of dispensary doctors. The Medical Union has invited its members in the different areas throughout the country to consider the proposal and express their opinions.

RESEARCH APPOINTMENTS

The Medical Research Council of Saorstát Éireann has appointed Dr. R. A. Q. O'Meara for one year to investigate the experimental production of therapeutic antisera; the work is to be carried out in the school of pathology, Trinity College, Dublin, under the direction of Prof. J. W. Bigger. Dr. J. C. Flood has been granted a part-time appointment for a year to study the total body electrolyte; he will work in the pharmacological laboratory, University College, Dublin, under Prof. E. J. Conway. Grants-in-aid have been awarded, for the purchase of apparatus or for research, to Prof. J. H. Biggart, Dr. P. C. Bresnihan, and Dr. J. D. H. Widdess.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

MENTAL DISEASES

CONTINUED progress in the institutions and clinics under his charge was recorded by Prof. D. K. Henderson in presenting the annual report of the Royal Edinburgh Hospital for Mental and Nervous Disorders. He said that public opinion is becoming better informed and more charitably minded towards the mentally ill patient. He stressed the danger of any attempt to divide physical and mental health into separate categories. Clergy and other lay persons have in recent years been tending to invade the psychiatric field, and if allowed to do so, they are likely to perpetuate the schism between the physical and mental which medical men have been endeavouring to heal. It is the physician alone who realises the risks and complexities of the treatment of highly charged emotional disorders. Prof. Henderson said that there can be no arbitrary division between the sane and the insane. Between the two there is a large group of people who are unable to adapt themselves to ordinary social life. The members of this group are very numerous, they form the most disruptive element in society, and we have no adequate provision for them. The development of a more positive health policy is likely to help this group. With regard to divorce and mental illness, Prof. Henderson said that one of the most disastrous and insidious forms of mental disorder has been deleted from the Divorce Bill, while other less serious forms are retained. He was referring to habitual drunkenness which, "both directly and indirectly, creates greater social disorder and distress than any other factor, and is one of the most difficult to treat."

PAYMENT OF HOSPITAL DOCTORS

As I have previously reported the directors of the Royal Hospital for Sick Children, Glasgow, consider that their medical staffs should receive reasonable remuneration for their services. In their annual report they stated that consultations have been

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taking place with the directors of other large voluntary hospitals in Glasgow on the subject of more adequate remuneration for the physicians, surgeons, and other specialists who have given their services to the hospitals practically gratuitiously. It has apparently been agreed by these hospitals that the time has now come when definite steps must be taken in the matter. One reason they state is that local authorities pay their medical staffs in rate-aided hospital and if the voluntary hospitals do not do likewise they will not obtain the services of the men they might otherwise choose to fill vacancies. It is also pointed out how much heavier the demands made on the hospital doctors have grown. This change in the conditions of hospital staffing seems bound to come before long. At the present time junior physicians and surgeons holding salaried appointments in municipal hospitals hesitate to apply for non-paid appointments in voluntary hospitals which necessarily involve their sacrificing the salary they are at present receiving.

ABERDEEN ROYAL INFIRMARY

The amount of work undertaken by the Aberdeen Royal Infirmary has increased greatly since the new hospital was opened. The average number of beds occupied by patients during the year was 490 and nearly 28,000 patients attended the out-patient departments. A psychiatrical department, including a lectureship in psychopathology, is to be developed.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENT)

PUBLIC HEALTH AND MEDICAL CARE

THE Medical Society of the County of New York invited three speakers from the field of public health to address it at the New York Academy of Medicine on Feb. 28th. Dr. John L. Rice, health commissioner of the city of New York, described efforts of his department to raise the standards of its service. "All over the country," he said, "health departments have been vulnerable to a charge of mediocrity of service." This he attributes partly to the deadening influence of routine. To counteract this influence a training programme for personnel of the department has been carried through. The plans for encouraging the use of specific serum in the treatment of pneumonia include the establishment of a typing laboratory in each city borough and the appointment of a corps of consultants who are specialists in this form of treatment. The department has been criticised for establishing venereal disease clinics that are independent of hospital administration. Dr. Rice expressed his willingness to turn over these clinics as rapidly as hospitals are prepared to accept the responsibility for their administration. Tuberculosis is still a major public health problem. Mass X ray for case finding will be used even more than in the past. More hospital beds are needed. The city has a slum clearance programme which will it is hoped contribute to the control of tuberculosis. Increased attention is given to ensuring that defects found in medical examination of school-children do receive attention either from the family physician or at a clinic. Better facilities are provided for care of the prematurely born infant. Finally decentralisation of administration is fostered by the establishment of 30 health districts within the city. Ten new buildings have been completed for district health centres and two more are in course of construction. Progress, he concluded, also includes retrenchment in functions that are found not to be productive.

Dr. Haven Emerson, professor of public health practice at Columbia University, said that public health administration is preventive medicine as employed by government for social ends. It is done better, he holds, if care of the sick is excluded from this programme. An exception is allowed when insufficient care is provided for a communicable disease. In rural communities it may be the function of a health officer to organise though not to provide care of the indigent sick. Dr. Emerson deplored the duplication and extravagance of much work by the voluntary health associations. If these agencies, he said, would devote only a small part of their present efforts to making the civil government do a good job, many of their expensive money-raising campaigns would be unnecessary.

The subject of the health department's interest in medical care was to have been presented by the State health commissioner, Dr. Edward S. Godfrey, Jun. He was prevented by illness from attending, and Dr. George H. Ramsey, assistant commissioner for communicable diseases, spoke in his stead. The health department has been interested in medical care, he said, from early days. The terms prevention and cure are not sharply distinguishable. Quarantine lies partially in the field of curative medicine in that a diagnosis must be made or attempted before imposing restrictions. Organised health work in many parts of the country began not with environmental sanitation but furnishing medical services at public expense. Physicians were employed under the title "vaccine physicians" in Baltimore as early as 1821. Each physician so employed canvassed the district in which he lived searching for and diagnosing small-pox and performing vaccinations. The title remained official until as late as the charter of 1909. Dr. Ramsey referred to the inclusion in the activities of the New York State Health Department at the present time of a cancer institute, orthopædic clinics, and an institution for crippled children. The Detroit health department maintains a large obstetrical service at the Herman Kiefer Hospital. He added other examples of medical care supplied at present by health departments, and then dwelt at some length on the programme of his own department for the control of syphilis and pneumonia. Both of these programmes have included the provision of post-graduate medical education designed to improve the quality of medical care. Turning to the present more controversial aspects of the problem of providing medical care, Dr. Ramsey referred to the rapidly growing lay concern in this subject, manifest in the press, in the radio broadcasts, and even in commercial motion pictures. A flood of medical bills, some good and some bad, has been introduced at the present session of the State legislature. There seems to be no doubt of the need for medical care. Need differs from demand and supply. Dr. Ramsey drew attention to a curious interpretation of data in an editorial entitled A National Health Programme in the *Journal of the American Medical Association* for Feb. 26th. Referring to the National Health Survey, the statement is there made that families with incomes in excess of $3000 have medical care for 83 per cent. of the people, while relief families have medical care for only 70 per cent. The conclusion is drawn from these figures that if 17 per cent. of families with sufficiently large incomes to obtain medical care did not do so, the actual deficit for medical care not received by relief families was only

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13 per cent. "The original figures in the survey report," said Dr. Ramsey, "refer to proportions of individuals with disabling illnesses, not to 'people.' Taking this fact into consideration, the inference from the editorial is that the 17 per cent. of the cases in higher income families did not need medical care even though each one disabled the patient for a week or more. At least in calculating the so-called 'deficit,' demand, not need, is considered." Dr. Ramsey characterised this attitude as ostrich-like although he admits that it is not new. Whether in high or low income groups, persons with disabling illness should have and be taught to demand medical care. The creation of this demand cannot be undertaken by the physician in private practice. Should the task of bringing under care all disabling illness now untreated be delegated to the public health services, Dr. Ramsey thinks it would probably be undertaken by greatly broadening education activities and in particular the work of public health nurses "who on each visit are directed to look for other medical situations than the one specifically prompting the visit, and to urge and arrange for treatment if apparently needed."

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM VRATCH

III

ONE evening just after tea in the middle of winter, the servants in my hospital in a Russian village came to tell me that a peasant wished me to pay a visit. A snowstorm was blowing up so I knew the matter was serious. In the hall a dejected peasant was standing waiting. He asked if I would go to a woman who had been delivered four days before, but was desperately ill. When he told me it was his wife a chill struck us as if the felt-covered door had blown open and let in the cold air. We were accustomed to tragic news from those thus fearing bereavement; but in addition these words conveyed to us the fact that the snowstorm now raging was so terrific that the poor fellow could not persuade any relative or friend to face it. Though she was dying he had had to leave his wife and himself risk even disaster in getting aid. I made only one stipulation, that after my work for his wife was done he must get me driven back for the hospital duties next morning. He agreed and we set out.

As a sensible person when rations are uncertain will stuff into himself as much as he can eat, to make up for depleted reserves and lay in a provision for the future, so any sensible traveller leaving a warm stove and wrapped in sheepskins, still warm from the cupboard, would snatch a period of sleep before the frost began to cause distress. By the time the sledge had reached the end of the village I was asleep. It was an uneventful twenty miles. The night was terribly cold but it did not break through my layers of fur. Innermost was a close-cropped sheepskin lining to a sort of melton great coat, outside of which was a coat of long-haired sheepskin, not buttoned but held together with tied thongs. Over all was a garment transcending tailors' terminology, shaped to be sure like a coat but so large that thirteen sheepskins had gone to its making. This vast envelope, showing to the world the white inside of the pelts, was kept in position by a girdle curiously patterned and woven in scarlet and white, half a yard wide and four or five yards long—a present from a grateful Tartar—wrapped round the belly of this mountain of hides. The collar when open fell over the shoulders like a mantle; when closed it crossed over the face and stood up like a conical dome over its wearer's head and was kept from falling by a narrow hand-woven braid tied in front with a bow knot for quick release in case of being pitched head first into a snowdrift. The feet are protected with stockings made of camel hair, thick as blankets, and the legs are thrust into knee-high wide felt boots; there must be no pressure for if skin circulation is stopped even over a small area the result is frost-bite, and (since it may in the recoverable stage pass unnoticed) necrosis. It was indeed wise therefore to get one's sleep while one was still warm.

* * *

When I unpacked the instruments in the patient's house the skin of my hands froze to the cold metal, after which warning I handled them through a towel to prevent a "cold-burn." The patient had been delivered of a dead child and some of the placenta had stuck. The village gamps had been at work with unwashed hands and a teaspoon; these measures proving unavailing the old women had used an S-shaped thick wire lamp-hook, rusty and besmeared with greasy soot. The lacerations produced by its use were dreadful.

The professional situation was a delicate one. If I told the gamps what I thought of their methods and of their choice of implements I should make enemies of them, and as I had to leave the patient in their care it was desirable to obtain their friendly assistance. As for instruments, I doubt if there was such a thing in the whole village as a metal tablespoon (whose handle might have served). The lamp-hook seemed to me inexcusable; however it must be remembered that when face to face with a crisis, and ignorant of the least thing that will remedy the condition, when fear benumbs the mind and one loses contact with one's experience of past difficulties and the way to overcome them, then with nearly all of us a stupefying hate surges up, and the crudest and most violent actions are performed in place of more gentle and skilful ones. I was half sorry for that huddle of shrivelled old women as they passed the hook from one to another, showing it to me as if they felt caught in an evil confederacy and could only excuse their action by giving it the semblance of a joint undertaking. Perhaps it would have been wiser to use their services but I could not trust their obedience; so they were sent to borrow samovars and prepare boiling water, which they could not very well infect.

The details of the gynæcological operation are immaterial. I had to sterilise the instruments three times because of the crawling infestation of cockroaches which ran over the table and dropped from the ceiling. (Cockroaches live on bugs, by the way, so many peasants prefer them in the house; but I, who grow quickly immune to bug bites, prefer these to the restless, rattling scurrying of cockroaches over face and hands when sleeping in the peasants' huts.) I organised as helpers the girls of between 14 and 18 who had been to school, hoping thereby to instil,

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though it be only by a few hours' example and instruction, something of the need for care, cleanliness, and gentleness of touch in these affairs. The village appeared to have about five or six girls of the right age and educability to choose from; they were all given duties.

Eventually the exhausting business was done, and I asked for food. No! I could not have food, did I not remember it was a fast day? I begged for it, said it was near midnight and I had to drive back to the hospital at once (they shuddered); I implored them to give me hot milk, eggs, and bread, saying that the priest had allowed me to give the indulgence of fast-breaking to patients physically in need of food, and I would make it right with their priest if they would give me some. They were adamant. Then I thought of a ruse. I moved the instruments into the kitchen and said I must pack them up by myself. They readily agreed, but realising I was going to steal some bread moved every eatable from the place first. For my comfort perhaps it would have been better if I had employed those old women round the instruments and the bed rather than in merely boiling water in the outer-world of the kitchen; for it was they who raised objection to my taking food, in the belief, I imagine, that it would go ill with the patient if I did.

After seeing about a dozen other patients in the village ("since you are here, doctor!") the patient's brother this time and I set off on the return journey still supperless.

* * *

There are two kinds of snowstorm: there is the fluffy kind we have in England, in which snowflakes fall gently sloping through the breeze and delight us with their cool moist dabbing, and there is the burran. It is not only snow that falls in a burran, but also ice-crystals that have lain and hardened on the ground are picked up by the wind and hurled through the air. The flying ice lashes the skin so that to the pain of cold there is added the torturing bombardment of these sharp, hard particles.

Within half an hour of our departure a burran in full strength was upon us. Swiftly it penetrated layer after layer of those sheepskins and the heat of the body felt powerless to meet and throw off the onset of cold. Exhausted with the night's work, which besides being medically tricky had been socially difficult, I found myself overpowered with sleep. I seemed to be travelling in a curious luminous blue haze; it was cold of course but not unpleasant. Sensation was becoming numbed, indeed for some reason being a tiny island in an ocean of cold was not a bad experience. I began to feel an interest in sensations again, the blue haze was rather fascinating and there were faint lights floating or revolving before my sightless gaze. It was quite pleasant to watch their movement which one felt might go on for ever and for ever. Suddenly the faint lights raced in circles and exploded, and at the same time I heard a crash in my skull. I came to with the sledge on top of me in a snowdrift. I had fallen asleep, and so, I imagine, had the driver. In the upset a shaft had been broken.

It is a weary task to mend a sledge shaft by day in still air, there are never any tools but an axe and always too little rope; but in a burran at night it is torture. The ropes are stiff with frost, the fingers get so cold that they will not bend to grip the shaft pole, still less the thin hemp cords, and every movement of the limbs is hampered by the mattress-thick layer of sheepskins that one dare not throw off lest the low temperature congeal the muscles into immobility. However, the shaft was mended at last, the horse put back, and on we went; but soon we overturned again. The splice had worked loose, so that the pull of the sledge on the animal becoming suddenly lopsided, he had been thrown one way and we another. Again the struggle with the shafts and cords, and again the horse was put back into harness; but now its nerve had gone and it would not move. So by turns we walked at its head, tapping the snow with the butt of the whip to feel it solid under foot, patted the animal's nose, talked to it, and led it along yard by yard. Thus we progressed for I judge about an hour. At last the horse took to trotting without being led so we both got into the sledge and once again I dozed off, to be woken up by the stopping of the sledge. We had gently slid into a drift. The driver, having now given up hope, fell on his knees praying, and asked me to join him; "We will pray and then die." At this craven and fatalistic suggestion I flew into a rage and knocked him down, asking how he dared to talk about dying, and besides we were pledged to be back in the hospital at eight o'clock in the morning! Then I dumped him in the sledge and tried to stir up the horse. The poor creature was immovable; and although it would obey its master better than it would me I could not trust the peasant on the snow lest he started kneeling again, so I had to lead the horse myself using both the coaxing language and also some of those half-Oriental curses which keep Russian horses on the move. By whichever persuasion the animal finally started to trot, so I got back into the sledge for a rest.

But the driver now seemed to have lost his reason. He kept on repeating "It is foolishness to go on; better die, better die!" Every time he yielded himself to the thought of death my anger was roused afresh; each appeal to resignation was responded to with curses and blows. Under this treatment his view changed; I ceased to be human; it was obvious, he told the Deity, that I was a devil under the protection of Satan. The villagers had rightly called me "The Great White Devil" (a name I had regarded as an endearment and had ascribed to my large outer coat); it was obvious, he went on in a sort of mixed prayer and conversation with God, why the church bells were never rung for me to guide me when I was out in a snowstorm, the reason why I was thought to be indestructible was now clear—the devil looks after his own. Alternately praying to God and cursing the fiend in the sledge behind him he jogged the horse along.

When he was silent I feared that he had resigned himself once more, so I stirred him up with kicks and oaths, knowing from my experience of anger at him how warming it was! So hour after hour passed in the cursing and fighting of two half-frozen mortals moving painfully over a vast empty expanse of snow under a canopy of hurricane and ice.

At length we saw stacks and hurdles and other outposts of human habitation. It was a Khan on the track of a Tartar trade route. So far from our proper and ordinary road were we that I had not even known of the existence of the place. In the starlight we stumbled over sledge ropes and bumped into squatting camels in the courtyard of the Khan; it was good to hear their contemptuous guttural grunts (though Russians loathe them usually). We burst into the great kitchen, hot as an oven, where a score of Tartars and Kirghiz were snoring in their shirts. We took off our sheepskins, held the inner ones against the walls of the oven to warm

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them, and then, putting them on hot, lay on the floor for an hour's sleep.

* * *

The last few miles to the hospital were the worst. After a certain point has been passed the experience of freezing is not painful; the reverse process is an agony of mind and body. The hour's baking in the Khan had been the turning point, so that now, though dawn was breaking and the world was beginning to reshape itself as some external thing that would have to be dealt with, I felt that the task was insupportable through lack of inner strength, and that the pain would go on and on and the spirit sink down and down to an unstruggling and inevitable eternity of suffering. Eventually we arrived at the hospital compound, and when passing under the gable end of my house I saw a Siberian crow, which had wintered under the eaves and which I had always looked for with pleasure every morning, frozen dead on the ground. I suppose that the 87° F. of frost registered that night had been more than it could endure. The sight of its stiff body was a shock, but I thought "I am glad of it! If I know that it is dead I know that I am alive!" In some way that ruthless life-greedy thought produced a change in my mind.

* * *

The servants on our arrival were not sure whether it was us or our ghosts; I soon proved which view was correct, for by good fortune a ham had been boiled and was still in the pot, steaming hot. I ate such slabs of it as I thought not possible for a mere human to consume. But it made no difference; though I knew I was alive my body still felt dead. The hot meat within soon seemed to cool down to the corpse-like temperature of my body; nothing seemed to give the feeling of heat and inner life which sustains our courage and gives a feeling of health though we do not realise this until it is lost. Three times that day the fires were lit in the great stoves and I would have had them relit again but the servants refused lest the over-heated stoves burn the house. My table and bed were moved against them, but without effect. For nearly a day my skull felt like a helmet of cold steel under a layer of tepid and scarcely living flesh, the ribs were a chill cuirass which seemed to frost the drawn-in air, the long bones of the arms and legs felt like cold iron bars inserted between the muscles, heavy and chilling *from the inside*. The horse was laid up for a week and it took the driver two days to recover.

The silly fellow immediately on our arrival and before taking to his bed went among his acquaintances in the village and spun them an astonishing tale of the horrors of the night; but it was not the agonising pain of straining to bend frozen fingers round the shaft and gripping the stiff ropes to lash the broken ends, not the misery of that isolation in the very heart of coldness, no, nor the condition of his sister for whose sake the journey was taken. These were things of this world in which pain is natural. His tale was of having driven a devil who moved under the protection of Satan. I walked across from my house to the hospital at 8 A.M. to start up work as usual; but this moujik with his yarn had so diverted attention from physical ills to far more interesting metaphysical-theological questions about demons and their like that at first I got nothing from the patients but gaping stares; but soon reluctantly, apologetically even, (I am thankful to say not timorously—that nickname was not really taken seriously), they began as usual to tell me of their ailments.

Later I heard that the woman died.

PANEL AND CONTRACT PRACTICE

Juvenile Contributors under the New Act

UNDER the provisions of the N.H.I. (Juvenile Contributors and Young Persons) Act, 1937, which comes into operation on April 4th, boys and girls who leave school and become insurably employed will be entitled to medical benefit, but not to sickness or disablement benefit until they attain the age of 16. Already approved societies are obtaining members from among these young people, and are sending the necessary notifications to insurance committees, who are preparing medical cards which will be issued early in April in respect of those who have taken advantage of the opportunity to become members before they have actually begun to contribute. Each "first" medical card issued to juvenile contributors will contain a message from the Minister of Health.

It is however unlikely that more than a small minority will apply for society membership before they begin to contribute, but medical benefit will be available for all of them as soon as they become insurably employed, and it is likely that some will require medical treatment before they have had a medical card issued to them—which will not happen until the insurance committee becomes aware of their existence through the society concerned. Contributors who have not joined a society will be able to obtain a temporary medical card by applying to their local insurance committee and submitting evidence of insurable employment, such as a contribution card bearing insurance stamps, or a certificate from their employers. Even if they have not obtained a medical card treatment should be given when required if they claim to be insured, but under Clause 7 (2) of the terms of service the practitioner concerned may charge a fee by way of deposit provided he gives a receipt on form G.P. 4 for any fee so charged. As juveniles will not be entitled to receive certificates of incapacity until they reach the age of 16 insurance committees have been told that it would be of assistance to practitioners if the words "not eligible for certificates before . . ." were stamped on the front of the medical record, and the date of the 16th birthday entered in the blank space before issue of the records for juvenile contributors.

To provide for its equitable distribution the practitioners' fund for 1938 will be divided, 24·25 per cent. being distributed for the first quarter and 25·25 per cent. for each of the other three quarters. Arrangements are also being made to ensure that practitioners in rural areas who are required to dispense for their patients will receive special credit for the second quarter in respect of any juveniles concerned. Some practitioners whose lists are at or approaching the maximum number of insured persons may desire an increase in the maximum to enable them to accept applications from juvenile contributors, and the Ministry have suggested that this can be best effected by the exercise by committees of their power of making special exceptions to the normal limitation, with the approval of the Minister, under the allocation scheme. This does not necessarily mean that a permanent increase will be permitted.

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SCHOOL RECORDS

A circular (Form G.P. 90) is being issued to each insurance practitioner drawing attention to the provision made under the Act for enabling a practitioner to obtain such particulars of the school medical record of any "young person" whom he has accepted for treatment as he may deem necessary for proper treatment. The information can be obtained from the local education authority in possession of the record, either by direct application or through the insurance committee, and will in either case be supplied direct to the applying practitioner by or on behalf of the school medical officer. A simple form, of a size to fit into the form of medical record, has been devised whereon the applying practitioner will insert the name and other particulars of the young person, including details of the last school attended, and this will be returned after the appropriate data of school medical history have been inserted. The hope is expressed in the circular that practitioners will make a habit of including this form within the insurance form of medical record, so that it may be available for reference both by themselves and by any other insurance practitioner to whom the insured person (and his medical record) may at any future time be transferred. The school medical records themselves vary so much in size as to be quite unsuitable for transmission, and this form provides a convenient way of linking up the school medical history with the later clinical history. A negative history will be as useful as a positive one.

CORRESPONDENCE

REST AFTER OPERATIONS

To the Editor of THE LANCET

SIR,—My remarks at the meeting of the Medical Society of London were intended solely as a contribution to the discussion of the causes and treatment of flatulence. My contention, which was clear to those present, was that a fluid diet and even strict confinement to bed were not only unnecessary (after a clean muscle-splitting abdominal incision) but actually favoured the production of flatulence. I used the words "In young and otherwise healthy people" as a preface to these remarks, thus excluding neurotics and those who like to feel that this much-vaunted rush of modern life is telling on their nerves. If any psychological trauma is occasioned by operations such as I quoted its effects will be enhanced by confinement to bed, by riveting attention on a trivial ailment. When by the third day is added a rumbling of the bowels and abdominal distension is it surprising that the victim becomes gloomy if not even hysterical?

Conversely, to allow the patient, if he feels so disposed, to sit up the next day and even walk about a little restores the operation to its correct position of importance, prevents the loss of vasomotor tone responsible for the exhaustion of convalescence and, in conjunction with a solid diet, obviates post-operative flatulence. There was never any suggestion that patients should be forced to get up against their will. If he is of the type Dr. Seymour Price has in mind he will far more quickly recover mental and physical health by these means because he will the sooner leave the nursing-home and thus enjoy the benefits of country or seaside convalescence earlier and for a longer period. Those who indulge in an unnecessary appendicectomy as a temporary escape from marital infelicity or other environmental difficulty form, I admit, an exceptional group. The discussion was, however, on flatulence. This according to Dr. Seymour Price can be either prevented or cured. Many of my fellow members will share my regret that he was not present to tell us how. I am, Sir, yours faithfully,

A. H. DOUTHWAITE.

Harley-street, W., March 12th.

TOWARDS CADAVER BLOOD TRANSFUSIONS IN WAR

To the Editor of THE LANCET

SIR,—With a view to using cadaver blood for transfusions in the front hospitals in Spain, I have made certain preliminary examinations in order to test its qualities. Conditions of work did not allow this check-up on Yudin's work (*Lancet*, 1937, 2, 361) to be more than a brief indication that the method is both practicable and valuable. The work was done under the constant and disturbing threat of air-raids, and mostly out of touch with the laboratory and in the midst of other medical work.

Five cases were examined, all young men between the ages of 20 and 30. In the first four nothing further was established than that in these cases of sudden death the blood did not coagulate in the manner usual with living donors. In the fifth case a large quantity of blood was collected but circumstances made it impossible to ensure asepsis or effective refrigeration.

CASE 1 died of internal hæmorrhage within three hours of receiving a bullet wound of the chest and abdomen. Ten minutes later blood was removed in a sterile syringe and put into a sterile test-tube. Three hours later slight retraction of the corpuscles from the side of the tube leaving clear serum indicated the beginning of clotting. Slight agitation caused this to disappear, and not to reappear. Three days later the blood was still completely liquid. This was the first indication we had had of the existence of "fibrinolysis."

CASES 2, 3, and 4.—Bombing of the village left three men buried in a cave. Asphyxiated, they were brought dead to the hospital. Four hours later blood was collected from each as above. It remained liquid for a further eight hours, after which it had to be rejected owing to removal of the hospital.

CASE 5 died in the ambulance on the way to hospital of severe wounds of the head and abdomen caused by a shell. The shortness of time after death of examination is indicated by the rectal temperature which was 98·4° F. The immediate cause of death appeared to have been hæmorrhage. There being a momentary lull in the work, and our laboratory being available, I obtained the coöperation of Dr. Barsky and his surgical staff for the extraction of a larger quantity of blood, which I hoped might be used in a transfusion, after the necessary examinations. The special material needed for the extraction though simple was not available. An attempt, however, was made to sterilise a 4-litre bottle, keeping it for five minutes neck downwards in a jug of boiling water. A piece of rubber tubing about 5 mm. in diameter and 1·5 metres long was sterilised by boiling. The head being held over to the left, with normal sterile technique, a long incision was made along the anterior border of the sternomastoid, which was retracted outwards and backwards, and the carotid sheath found and opened. The internal jugular vein was separated and two ligatures passed round it. The upper ligature was tied, the vein opened, and the rubber tube passed some 10 cm. down the vein towards the heart. The second ligature was used to tie in this tube. The other end of the tube was placed in the bottle. The foot of the table was then tilted up to an angle of about 15° with the horizontal. The blood began to flow,

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and the flow was increased by massaging the legs. Some of the blood was transferred to two sterile test-tubes; 700 c.cm. was obtained in all. One tube was sent to the travelling laboratory and examined by Jean Picone two days later. The other tube and bottle were kept in water at a temperature of 40°–50° F. in the absence of a refrigerator. The blood did not coagulate, but that in the bottle was badly laked within two days, and so was obviously unsuitable for transfusion. That in the test-tube remained unhæmolysed for a fortnight and was then discarded. The laboratory report on the smaller sample was as follows: Sedimentation-rate in Westergren tube after 1 hour, 2 mm.; after 2 hours, 4 mm.; after 3 hours, 7 mm.; after 24 hours, 41 mm. Meinicke and Kahn reactions negative. Red and white cells normal in quantity and appearance. A few cocciform bacteria seen, due probably to imperfect asepsis or sterilisation of instruments and apparatus used. The appearance of the plasma after spontaneous sedimentation slightly hæmolysed.

It is hoped that when time permits we shall be able to get the necessary material and organisation to be able to collect cadaver blood aseptically, to keep it in a refrigerator, and to use it in transfusions. The advantages of this blood appear to be: (1) it does not need an anticoagulant and therefore can be used in large doses without fear of toxic effects; (2) it could be made available during military operations on a large scale; (3) it can be obtained without any question of endangering the health of the donor; and (4) possibly it keeps longer without autolysis than citrated blood owing to its unadulterated state.

I am, Sir, yours faithfully,

R. S. SAXTON.

Servicio Sanitario 35E, Albacete, Spain, Feb. 14th.

SPA AMENITIES

To the Editor of THE LANCET

SIR,—During a visit to Czechoslovakian spas last autumn I noticed a feature of one of its spas, Pistany, which offers an example that might well be followed in this country. Besides the first- and second-class baths is a third-class establishment named "Pro Patria." This is a very large institution built on the block system and accommodating 600 people with residence, board, and treatment. The beneficiaries consist of two classes: (1) insured members of friendly societies and of State railways, and (2) soldiers. I paid several visits to this establishment, the most interesting of which perhaps was during the serving of the midday meal. The large, light, and airy kitchens, the white-uniformed staff, the spotless cold-storage plant, and the appetising smell and taste, and the manner of service of the various dishes were impressive. The establishment of this kind of institution at British spas would be a boon to many patients; at present a hospital patient who needs resident spa treatment has first to collect the necessary funds, and this often proves an insuperable obstacle. For those who can afford to pay a certain amount there are provided at the "Napoleon" second-class baths; the actual administration of the treatment and even the surroundings are hardly distinguishable from those of its more expensive neighbour, the "Irma." Associated with these second-class baths is hotel accommodation at the "Cyril" where for modest charges bedrooms containing one, two, and three beds can be secured. Each room resembles in its make-up the most modern of nursing-homes, and the usual hotel lounge and a dining-room are available as common rooms. Its residents are partly "private" visitors and in part drawn from the higher grades of insured employees. There is a flat-rate charge of 110 K. a day (7 K.=1*s.* in English currency in September, 1937) for everything, including medical services. The most expensive establishment the "Irma" is literally part of the Thermia Palace Hotel, and the treatment is therefore administered for those staying at the hotel as conveniently as by walking from one's bedroom to the bathroom along a hotel corridor.

The three main bathing establishments lie on an island which is formed by a fork in the River Waag, and the hot sulphur and "radio-active" mud, volcanic in origin and largely mineral in content, as well as the hot springs are made use of for packs and baths almost as they emerge from the earth. All the surroundings are extremely well planned. At the back of the "Thermia" is a square courtyard sheltered from the sun by spreading trees and large enough for dancing in the summer evenings, beyond this a sunken garden, and beyond that again the Waag. Running from the hotel front are long tree-sheltered walks, leading to a nine-hole golf course, an open-air swimming pool, and, further off, the aerodrome, whilst the rest of the island is planned on similar pleasant lines. The town itself, on the opposite bank of the river, contains, suitably, no excitements, and part of the country is drab; part, though, is covered with hilly forest land.

At each of the three other spas in Czechoslovakia that I visited last year there are features of which we could usefully take note in this country. Karlsbad, which can be reached direct by air in a journey that involves little fatigue, lies in a hollow with beautifully wooded surrounding hills; part of it is extremely primitive but one long street is a combination of Bond-street, the Bois de Boulogne, and the more picturesque parts of Torquay. I purposely avoided the luxurious hotels at Karlsbad, and found in Joachimstal modest ones with reasonable charges, unexceptionable food, service, and a *private bathroom*. At Marienbad I stayed at the luxury hotel, the Weimar, and was impressed by its high quality and the beauty of its surroundings. The actual charges are always obtainable in advance from the municipal authority.

I am, Sir, yours faithfully,

Harley-street, W., March 10th. R. S. WOODS.

A RECTAL PLUG FOR PILES

To the Editor of THE LANCET

SIR,—In your issue of Jan. 15th (p. 141) Dr. St. John Lyburn described a wooden plug he had designed for the application of pressure in the injection treatment of hæmorrhoids and prolapsus ani. I feel it would be worth while publishing an experience of my own in this connexion. Last Easter when away on a holiday I was called in an emergency to see an elderly lady with thrombosed piles prolapsed through the anus. They could be reduced digitally but came down again at once, and it struck me that if they could be held up in position the condition might be relieved and fibrosis might take place naturally. A pad held against the anus was useless, so I attached the larger end of a small cork to a bandage and inserted the cork lubricated with vaseline through the anus, keeping it pressed up by attaching the bandage to a band above the hips. The result was entirely successful, and the patient has not complained of anything since. On coming back to London I found that various plugs had been devised for this purpose; but the dimensions and shapes did not seem entirely satisfactory. Messrs. Down Brothers have now made an apparatus for me which should answer the purpose.

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Dr. Lyburn uses his plug after treatment of the hæmorrhoids by means of injection; but I feel that if it was used in the first place injection treatment and even operation might be avoided. One type of plug is called the "Little Wonder," and I see that Romanis and Mitchiner suggest that this should be rubbed up and down and that it may be successful in slight cases by irritating the mucosa and so causing it to fibrose. Like Dr. Lyburn I would suggest that continuous application is advisable and that even comparatively severe cases may yield to this treatment; but further experience is desirable.

I am, Sir, yours faithfully,

London, W., March 11th. E. P. POULTON.

THE WEEK-END HABIT AMONG DOCTORS

To the Editor of THE LANCET

SIR,—Let nobody accuse me of having anything but the greatest respect and affection for the medical profession; I seem to be a lay member of it. It is this that makes me take up the cudgels when I hear the profession abused. I have just had to do so, but I am bound to confess I felt that there was a fair substratum of truth in the accusation. It was this: that doctors in these days take little interest in saving the lives of their patients, that they treat the whole thing as a business and show little or no appreciation of the anxieties of the patient or the relations. I have been brought up to see that the doctor's life was one of great personal sacrifice; but to-day I do not see so much of this, I hear and know how surgeons who do serious operations on a Thursday scuttle away for a week-end on Friday night, leaving the patient in the nursing-home or hospital to the care of others. I know that it is now a common thing for general practitioners to take week-ends, or days off each week, and leave their patients to rip or to call in a partner if they feel desperate. If there is no partner, the patient has to lump it; etiquette forbids calling in anybody else.

I am aware that since the Great War death is now looked upon, in what may best be described as a very casual manner, by a large number of materialists. But let the medical profession take to heart that it is in times of dire sickness that they are on their mettle, that they are expected to do all that in them lies to ward off death, and that it is then that, however much they know themselves to be up against the inevitable, to the lay mind our knowledge of disease and its cure seems to have progressed so little. That is the view of the patient and the relatives. Without sacrifice, without a deep sympathy, medicine is a common business.

I am, Sir, yours faithfully,

ERNEST GOODHART.

Gloucester-terrace, Hyde Park, W., March 15th.

WATER-BORNE TYPHOID

To the Editor of THE LANCET

SIR,—The article by Dr. Duncan Forbes in your issue of March 5th, which, if he will allow me to say so, is one of the most sensible and helpful that I have ever read, prompts me to refer to another factor in typhoid infection. I go back to the excreta of the patient before they get into the water-supply. While there are unrecognised cases in private practice—I have notes of many seen in consultation—it is safe, I think, to say that the bulk are notified and removed to hospital. Then the procedure varies. In large towns with thoroughly controlled water-supply and sewerage, both on a big scale, it may be that the risk of emptying untreated excreta down the drains is negligible in regard to infection of the population, but that is a matter for the M.O.H.

On the other hand, many cases are treated in small isolation hospitals in places where control of the local water-supply may be difficult. In such circumstances I submit that it is not justifiable to put infected excreta into the hospital drains or to discharge a patient until there is reason to believe that his excreta—fæces and urine—no longer contain typhoid-paratyphoid organisms. That can be done quite easily by allowing the excreta to stand in a well-ventilated annexe or even out of doors in contact with a reliable disinfectant for one hour before they are emptied into the drains. While handling them, the nurses should wear stout rubber gloves of the cheap "domestic" variety. It is essential that the disinfectant should have a high coefficient against typhoid bacilli and that its action should not be markedly inhibited by the presence of organic matter.

Secondly, the fæces and urine of convalescents should be bacteriologically examined and the patients detained until the results are negative. Then remains the problem of the carrier. If the excreta still contain these bacilli at the end of two months after the temperature has been normal and there are no complications, I submit that such a person should be regarded as a carrier and the drains protected, secluding him until he is no longer a potential danger. In prolonged cases, removal of the gall-bladder seems to be the only effective measure. Let the problem be dealt with at its fountain head.

I would add that in private practice doubtful cases should have their excreta disinfected. Given rubber gloves and intelligent nursing there should be no difficulty in this. The danger lies in the patients being labelled "gastric influenza," or perhaps "ptomaine poisoning."

I am, Sir, yours faithfully,

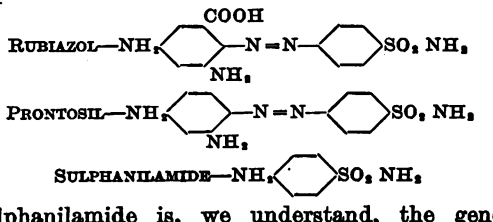
A. KNYVETT GORDON.

Bedford-square, W.C., March 11th.

THE FORMULA OF RUBIAZOL

To the Editor of THE LANCET

SIR,—In an annotation on p. 1152 of your issue of Nov. 13th, 1937, it is stated that Dr. de Léon "used Rubiazol Roussel (which corresponds to Prontosil) . . ." May we point out that our preparation differs both from prontosil and sulphanilamide. Rubiazol is an azo dye possessing a carboxylated function, and has the formula 6 carboxy 2·4 di-amino 4 sulphamide azo-benzene.



Sulphanilamide is, we understand, the generic term applied to para-amino-benzene-sulphamide, which is a white body without any azoic molecule. Prontosil differs from rubiazol in that it does not carry the COOH group. We believe that the particular formula of rubiazol enables it to possess a high chemotherapeutic coefficient which results in certain clinical advantages—e.g., its high activity at low doses, and its freedom from clinical manifestations of toxicity.

We are, Sir, yours faithfully,

ROUSSEL LABORATORIES LTD.

Cavendish-square, W., March 9th.

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LUMP-SUM SETTLEMENT OF COMPENSATION CLAIMS

To the Editor of THE LANCET

SIR,—Mr. H. Ernest Griffiths in your issue of March 5th gives the result of a three-year follow-up investigation carried out in New York of 322 workmen whose claims for incapacity from accident were settled by a lump-sum payment of *£200 or over*. Of these, under 3 per cent. had made a complete recovery; of the rest about 100 men had been able to resume their pre-accident work or similar work, and about 83 had remained unable to obtain any work, whether or not they could do any. The remainder (about 117) had obtained work of a kind inferior to their pre-accident work.

These figures do not appear to argue against lump-sum settlement from the workman's point of view; for, in view of the size of the settlements, they would embrace only cases that must have been considered severe and likely to have some permanent or prolonged reduction of wage-earning capacity. The employers, in fact, might feel that they had been over-generous when, after paying weekly compensation and a sum of £200 or more in final settlement, one-third of the recipients were able to resume their pre-accident work.

Of the 64 "neurotic" cases only 17 (27 per cent.) were employed, and "only 17 of the 64 had received any positive stimulation from the settlement"—whether the same 17 is not stated. Such figures are not helpful except to show that all "neurotics" are not malingerers or hysterics. They would be of more value if the "neurotics" had been classified by a competent psychiatrist according to the nature of the mental disorder present, and if it were stated whether or not they had had skilled treatment. Obviously a settlement would not benefit a manic-depressive or a schizophrenic, or even an anxiety state unless its basis was an anxiety that could be dissipated by a sum of money alone; and these are few. Accident (or shock) is readily accepted as adequate cause for a continuing mental disturbance. This is never the real state of affairs. After psychological diagnosis must come psychological treatment in suitable cases, and not merely the application of "golden ointment." Unfortunately skilled investigation and treatment is rarely afforded to the "neurotic" in industry, while physical defects are always thoroughly treated—sometimes over-treated.

The argument against lump-sum settlement on the ground of the inability of the recipient in the majority of cases to put it to successful use is formidable. But I doubt whether the suggestion of a weekly allowance for a specified time would be suitable except in slight and fully recoverable cases, with which the statistics produced scarcely seem to deal. The best solution would appear to be the administration by a trustee of all settlements above a certain figure.—I am, Sir, yours faithfully,

B. BUCKLEY SHARP.

Harley-street, W., March 15th.

PUBLIC HEALTH

Safeguarding Water-supplies

IN a communication to local authorities and other water undertakers the Minister of Health reminds them of their statutory duty under the Public Health Acts or other Parliamentary enactments to ensure that their water is wholesome. Undertakings, he says, should be under the supervision of qualified engineers. Where water is being supplied without treatment, the undertakers must satisfy themselves by making frequent analyses that this practice can safely be continued. Under modern conditions more frequent analyses are needed, particularly where there is a tendency to fluctuation in the composition or bacterial content of the water, and undertakers should be guided as to the actual frequency by their expert advisers. Regular inspections should be made of the gathering grounds and surrounding areas and all possible sources of contamination should be removed. Where there is cause to think that any sources cannot be kept free from the liability to pollution, the water should be effectively purified, and there is need for special safeguards where water is supplied from wells or borings into chalk or limestone. The utmost vigilance is also required to ensure that no risk of contamination arises from operations in connexion with the normal maintenance and improvement of waterworks, and where men are working on a well it is essential either to cut off the supply or to give precautionary treatment to the water. The water committee and its officers should work in close coöperation with the public health committee and the medical officer of health and local authorities should make it their duty to bring to the notice of water undertakers cases of enteric fever and other diseases likely to be water-borne and also any building development or other operations which might affect the purity of the supply.

Notification of Measles and Whooping-cough

At present notification of measles is compulsory in eleven metropolitan boroughs, but in only one of these does it apply to all cases. If the first case in each household had been notifiable throughout the county during the epidemic of 1935–36, it is estimated that about 94,000 cases would have been notified, and the total number of cases was actually far in excess of the 54,200 of which the borough medical officers of health were aware. Whooping-cough is notifiable in five boroughs, in one of which the reporting is limited to first cases in a household and in another to children under five years. It is of great importance that early information regarding the incidence of these diseases should be available if measures for their control are to be effective. Further, compulsory notification has an undoubted effect on the attitude of the general public towards an infectious disease, a notifiable disease being regarded more seriously, parents being more ready to obtain early medical advice, a matter of the greatest importance in measles and whooping-cough. On Tuesday evening the London County Council accepted the recommendation of its hospitals and medical services committee that both these diseases should be made compulsorily notifiable throughout London. It is intended, however, that notification should not apply to German measles or to a second or subsequent case of either disease occurring in the same house within two months.

Ambulance Services

Suggestions have been put forward from time to time that all the ambulance work of the country should be brought under municipal or national control. At present the services in towns are mostly provided by the local authorities, whereas the rural

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areas are covered by the fleet of nearly 400 ambulances controlled by the Home Service Ambulance Committee of the Order of St. John and the British Red Cross Society. In their report for 1937 this committee remark that any scheme which substituted for the voluntary workers of the first-aid organisations paid staffs under municipal control would be deplored. Even if the patients lost nothing by such a change the first-aid workers themselves would lose the opportunities which ambulance work provides for gaining practical experience in their craft and for maintaining their keenness and efficiency. What would, however, be welcome would be a fuller recognition by local authorities of their financial obligation to a service which carries an increasing burden of public work.

OBITUARY

SIR RAYMOND CRAWFURD, M.D. Oxon., F.R.C.P. Lond.

Raymond Henry Payne Crawfurd was born on Nov. 9th, 1865, the sixth son of the Rev. Charles Walter Payne Crawfurd, J.P., of East Grinstead. He was educated at Winchester, where he was a scholar and was in the school football team, and at New College, Oxford. He took his degree with honours in classics in 1888. He then entered King's College as a medical student and throughout his professional life was connected with King's College Hospital. He was elected assistant physician in 1898 and was physician from 1905 to 1930. For several years before his election to the full staff he was dean of the medical school and took special pride in the numerous successes of the students in the Murchison scholarship. His affection for the hospital was unbounded and he played a leading part in organising its removal from Clare Market to Denmark Hill, and when the new medical school was complete in 1933 his devotion was fittingly recognised by the award of a knighthood.

Crawfurd's nature was not attuned to the hurly-burly of private practice and he never cared for it, but he fully enjoyed the calmer lines of hospital work, the patients in the wards, the teaching and the contact with the medical students. In his earlier years he was on the staff of the Victoria Hospital for Children and of the Royal Free Hospital; at the latter he lectured on pathology and at King's he was lecturer on clinical medicine. He also examined in pharmacology for London University. At the Royal College of Physicians he delivered the FitzPatrick lectures in 1911–12 and was Harveian orator in 1919. His classical attainments and literary tastes led him naturally to the historical aspects of medicine. He helped to found the section of history of medicine at the Royal Society of Medicine, and he published several historical studies, notably "The King's Evil" and "Echoes of Pestilence in Literature and Art," the latter founded on his FitzPatrick lectures.

Much of his most useful work was done outside the strict application of medical practice. His quiet determination was invaluable where organisation was involved. In 1925, after having filled in succession the offices of councillor, censor, and senior censor, he became registrar of the College of Physicians and from that time took an important part in its deliberations. His personal characteristics led to him being trusted by all and beloved by those who knew him. Tall, calm, dignified, and slow in movement, he was scholarly in speech but practical in judgment. His courtesy never left him in debate; he listened attentively to arguments and was ready to change his mind, but when he considered that right demanded it he was tenacious of his opinions.

In 1915 he was invited to join the council of Epsom College, and in a short time his wide knowledge of educational matters led to his appointment as chairman of the school committee; he became chairman of the council in 1923 and resigned in 1936 on the eve of a long cruise. In those thirteen years he gained the complete confidence of the council and got to know all the masters and all the officials as well as many of the boys. As chairman he never put forward a proposal involving a change of policy without first ascertaining the views of many of the members, and if there was the slightest sign of dissent he would withdraw the proposal at once, to be resubmitted when he had won over the dissentients. To the last he seemed unaware of the benevolent despotism which his council had created for him. He found Epsom College a school of 300 boys, of whom 100 were in the preparatory department; he left it 500 strong, all of public school age. Crawfurd thought the school was too solidly medical; "the boys dissect their breakfasts!" he said. "The school has a definite obligation to its neighbours; we must accept day-boys exactly like boarders except that they sleep at home." And there are now 150 day-boys. He set about seeing that the school should maintain a science side second to none; biology, chemistry, and physics secured their separate buildings with laboratories and lecture theatre, and much costly equipment, a great deal of which he unobtrusively gave, begged, or borrowed. His most arduous task financially was to secure money for the erection of the sanatorium built in 1931 at a cost of £27,000, of which he must have obtained a third by his persuasiveness. His invariable reply to the question whether any expenditure was justified and, if so, possible, was: "I am informed, on reliable authority, that the money is either available or will be forthcoming." And somehow or other it always was. For the Royal Medical Foundation he was a Knutsford; he wrote thousands of letters himself, and he was responsible for the abolition of the voting system for election of pensioners and foundationers, because he knew that under that system the most deserving did not always get their share of consideration.

Crawfurd remained very human in his leisure pursuits. He was a regular fan of rugby football. A drive to and from Blackheath or Twickenham to see a match was a continuous joy to him.

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Conversation might turn on the possibles for the next international, the merits of a probable hooker and scrum half, Epsom College, a recent work on medieval Europe, his last trip abroad, or anecdotes of Oxford and Winchester. A dramatic finish to the Navy and Army match on March 5th roused him to excitement and an attack of cardiac pain followed immediately. He knew his danger and viewed it unmoved, and he passed over calmly, a gentleman unafraid. He died at a nursing-home on March 9th at the age of 72.

Sir Raymond Crawfurd married Ethelberta Ormrod, daughter of Colonel Arthur Bailey, J.P., of Bolton, who survives him with three sons.

SIR ARTHUR DOWNES, M.D. Aberd., D.P.H.

Sir Arthur Henry Downes died suddenly on March 11th at his home on Mont Carmel, Palestine, at the age of 86. He was born in Shropshire in 1851, the son of Mr. T. R. C. Downes of Milford Lodge. From Shrewsbury school he went as a medical student to University College, London, where he was a gold medallist, and then to Aberdeen University where he took highest honours in the M.B. examination in 1873. He took his M.D. Aberd. in 1875 and a sanitary science certificate (the equivalent of the D.P.H.) at Cambridge in 1877. Between 1876 and 1886 he read a number of papers to the Royal Society on the action of light on bacteria, protoplasm, and chemical compounds, and he was the first to show that light inhibited the growth of bacteria. He was appointed M.O.H. for Chelmsford in 1879 and from 1889 to 1919 was Local Government Board inspector for the Metropolitan district. He served on the Royal Commission on the Poor Law and on various departmental committees, including those on the Midwives Act and the condition of the blind. He was chairman of the first Homeless Poor Committee for London and a vice-president of the Sunlight League from its foundation. He was knighted in 1910 and was a commander of the Order of the Crown of Belgium. His first wife, Evelyn, daughter of Mr. James Downes, died in 1892, leaving him with a son and a daughter. In 1902 he married Florence, daughter of Mr. Horace Chapman of Donhead House, Wilts, and sister of the Dowager Viscountess Allenby, and had one daughter.

Dr. HARRY ROSSER MANSELL, who died suddenly on March 10th in his seventy-eighth year, was a student of St. George's and served a period of apprenticeship in general practice before qualifying in 1887. He then settled in Hastings where for nearly fifty years his plate was a familiar sight on the corner house near the Castle. He must have been one of the first general practitioners to employ X rays in a case of fracture, and was rewarded for his enterprise by being sued, together with the radiologist, for an alleged X ray burn. During the war he was put in medical charge of troops stationed in the town. For some time he was president of the East Sussex Medico-Chirurgical Society. He was the typical family doctor, and like many such he will be mourned by some whose children as well as themselves he brought into the world. He leaves a widow and nine children.

PARLIAMENTARY INTELLIGENCE

HOSPITAL COLLECTIONS

IN the House of Lords on March 9th Lord STONEHAVEN moved the second reading of the Collecting Charities (Regulation) Bill. He said that a Departmental Committee set up by the Home Office in 1927 reported that witnesses had almost unanimously been of the opinion that the one method of collection which demanded control more than any other (except street collections) was door to door collections. Street collections had been dealt with very satisfactorily by the Police, Factories, etc. (Miscellaneous Provisions) Act, 1916. But that measure only applied to collections made on the thoroughfare itself. The present Bill was designed to prevent the scandals that had arisen owing to the operations of fraudulent enterprises. It proposed to prohibit house to house collections except where a police licence was granted or where the charity concerned was a national one which the Home Secretary might exempt from the provisions of the Bill. The Bill laid it down that a licence might only be withheld for one of four reasons—namely, that an excessive remuneration had been paid, or was likely to be paid, by the promoter to collectors; that proper accounts had not been kept, or that the affairs of the charity had been or were improperly administered; that a reasonably sufficient proportion of the proceeds did not reach the charity; or that the information furnished by the promoter was insufficient to enable the police authorities to form an opinion upon the propriety of its issue. Even if the police authority withheld a licence the promoter still had a right of appeal to a court of summary jurisdiction. He recognised that it was a delicate matter to interfere in any way with the collection of money for charitable purposes and although the Bill had been drawn so as to avoid injustice as far as could be seen, it might be appropriate to refer the Bill after second reading to a joint committee of both Houses of Parliament. In making that proposal he would mention two points. Lord Luke, acting on behalf of the British Hospitals Association, had suggested that the hospitals members of that association should be included as national charities and be exempted from the provisions of the Bill. There was a great deal to be said for that, and it was a point which might be considered by the joint committee. He had also received from Scotland expressions of regret that the measure did not apply to Scotland.

The Archbishop of CANTERBURY, in supporting the Bill, said that he constantly wondered both at the ingenuity of the bogus charity scheme promoter and the gullibility of the public. It was high time that something was done of a more drastic kind to protect the public.—Lord LUKE said that the Bill and its provisions had been carefully considered by King Edward's Hospital Fund and by the British Hospitals Association. Some hospitals had themselves suffered from the abuses against which the Bill was directed, and the hospitals were therefore disposed to approve the general principles of the Bill. At the same time, they feared that some of its detailed provisions might hamper their legitimate activities. The Bill already provided that national charities collecting over a substantial part of England and Wales might be exempted by the Home Secretary because of the large number of separate police licences which they would have otherwise to obtain. A simple voluntary hospital might not be a national charity in this sense, but the voluntary hospitals affiliated to the British Hospitals Association might well be placed on the same footing as national charities, since that association covered the whole country and was a responsible body which could vouch for its constituent hospitals. Any risks of abuse might be prevented if persons promoting a collection for an exempted charity were required to have a written authority from the charity.—The Earl of MINSTER, Lord-in-Waiting, said that a similar Bill was intro-

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duced in the House of Commons in 1929. The Bill was subjected to a great deal of strong criticism and it did not make any further progress after second reading. In the light of that experience this matter required very careful consideration before any further legislation was passed. The Government were perfectly aware that at times abuses did take place which could not be dealt with under the existing law and they were therefore prepared to support the second reading of this Bill provided that it was sent either to a joint committee of both Houses or to a select committee of their Lordships' House. He would consult the Home Secretary on that matter and would inform Lord Stonehaven of the result.

NOTES ON CURRENT TOPICS

Foot-and-mouth Disease Research

In the House of Commons on March 9th Mr. RAMSBOTHAM, in introducing the vote for a supplementary estimate of £229,450 for the Ministry of Agriculture, said that it was occasioned by the recent outbreaks of foot-and-mouth disease. It was supposed that migratory birds were responsible for the infection coming into this country. It was known that the disease could be carried long distances, and though it was not yet certain that birds were susceptible, it was highly probable that they were mechanical carriers of the virus. Research in this disease was carried out by the Foot-and-Mouth Disease Research Committee, consisting of eminent scientists in the medical and veterinary professions under the chairmanship of Sir Joseph Arkwright. It was giving particular attention at the moment to the problem of immunisation, which was complicated by the fact that there were several types of virus in this disease.—Sir S. CRIPPS said that he noticed that there was a saving of £80,000 on the diseases of animals grants in respect of tuberculosis in cattle, which was set off as against the expenses on foot-and-mouth disease. Why had less money been spent on dealing with tuberculosis in cattle? The Labour Opposition were most anxious to see that the purification of the milk-supply of the country was proceeded with as rapidly as possible, and that there should be no relaxation in the effort to free our herds from tuberculosis.—Mr. W. S. MORRISON, Minister of Agriculture, said that he could assure Sir S. Cripps that the saving was due to no slackening of the efforts of the Ministry to ensure a pure milk-supply, but was indirectly due to increased momentum in that direction. In the Agricultural Act passed last summer he (Mr. Morrison) proposed to make an assault on tuberculosis in cattle by means of a central State Veterinary Service taking over the functions performed by veterinary officers employed by local authorities. At that time he anticipated that it would be possible for the new service to take over its duties by Jan. 1st, 1938, but the date of the transfer had had to be postponed to April 1st and this accounted for the saving of money. There had been a satisfactory response by the agricultural community to the new inducements offered by the Act for attested and disease-free herds. The Government would not cease their research for the purpose of finding an adequate foot-and-mouth disease serum.

Physique of Army Recruits

On March 10th in the House of Commons Mr. HORE-BELISHA, Secretary for War, said that applicants were now trying to join the British Army at the rate of nearly 60,000 a year, a total far in excess of the War Office requirements. The proportion of rejections was very high and it would seem to be a form of national service to enlarge the system whereby recruits below the normal physical standards could be engaged and brought up to a better state of health. There could be no more impressive way of showing the parents of such boys what the Army could do to strengthen them and enhearten them by special diet, education, and exercise. Out of every 100 boys who had passed through the Physical Development Depôt established by his (Mr. Hore-Belisha's) predecessor at Aldershot, 92 had passed into the Army as fully fitted soldiers. In view of the very satisfactory results the War Office proposed to open at least one more physical development depôt in 1938. One of the items of diet on which recruits in the Physical Development Depôt were sustained was, in accordance with prevailing medical doctrine, milk. In future, not only these recruits but all others who, in the opinion of the medical officer needed special nourishment, would have an extra issue of half a pint a day. The cost would be £8000 per annum. It was the intention of the Government to adapt all barrack accommodation to the latest standard, though this would necessarily take some time.

Sheffield Hospitals

The House of Lords have given a second reading to the Bill to unite the Royal Infirmary, Sheffield, and the Sheffield Royal Hospital in one corporation on the same lines as the Birmingham and Liverpool Acts with a similar object. The power to provide accommodation for paying patients is subject to the control of the Charity Commissioners although later it may be found desirable to vest any jurisdiction of this kind in the Ministry of Health. In the schedule regulating constitution and management there seems to be no provision for persons to qualify as life governors by the payment of one sum, as generally prevails in hospital procedure, although a governor for life may be appointed "in consideration of extraordinary services" rendered to the hospital. The District Association of Hospital Contributors is given eight representatives on the governing body as compared with the four allotted to the Merseyside Hospital Council in the Liverpool United Hospital Act. General practitioners are to be represented by nominees of the local medical and panel committee. As it stands however the Bill does not give any statutory recognition to a board or committee of the honorary medical staff; this is an omission which should be rectified.

Date of the Budget

Mr. CHAMBERLAIN announced in the House of Commons on March 10th that the Chancellor of the Exchequer would open his Budget on Tuesday, April 26th.

QUESTION TIME

WEDNESDAY, MARCH 9TH

Accommodation at Roehampton Hospital

Mr. TOM SMITH asked the Minister of Pensions the number of beds available at the Roehampton Hospital for the treatment of ex-Service men; the number of cases treated during 1937; and the average length of time each patient was in hospital.—Mr. H. RAMSBOTHAM replied: The number of equipped beds available for officers and men is 414. 2195 cases were treated during the year 1937 and the average length of stay of those discharged was 79 days.

Non-Manual Workers and Health Insurance

Mr. NAYLOR asked the Minister of Health if it was within his knowledge, and with his approval, that national health insurance inspectors were ruling that partly employed non-manual workers in receipt of less than £250 per annum could not be recognised for national insurance purposes on the ground that, if they were fully employed, their wages would amount to more than £250 per annum.—Sir KINGSLEY WOOD replied: Rulings given by National Health Insurance inspectors in the type of case referred to by the hon. Member are governed by the provisions of the National Health Insurance Act. The question whether a non-manual worker is insurable depends on the yearly rate of his remuneration, and the Act provides that where the employment involves only part-time service the rate of remuneration is to be taken as the yearly amount that would be payable for whole-time service.

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Industrial Employees and Hospital Contributions

Mr. ROBERT GIBSON on March 9th asked the First Lord of the Admiralty if he was now in a position to make a statement regarding arrangements for collecting the contributions of the non-established workers in the Royal Naval Torpedo Factory, Greenock, to their hospital's fund from their pay.—Mr. GEOFFREY SHAKESPEARE, Parliamentary Secretary to the Admiralty, replied: The hon. Member will be pleased to learn that arrangements are now being made to institute the centralised machinery, referred to in the reply given to him on this subject on Dec. 15th last, under which Government industrial employees in any part of the country, not covered by existing contributory schemes, may arrange for contributions to local hospital funds by means of deductions from their pay.

THURSDAY, MARCH 10TH

Mothers Convicted of Infanticide

Mr. CREECH JONES asked the Home Secretary in how many cases during the 10 years ended on Dec. 31st, 1936, mothers had been convicted of the wilful murder of their children under eight years of age and had been sentenced to death and subsequently reprieved; and if he would give the age of each of the child victims concerned.—Sir SAMUEL HOARE replied: The following mothers were sentenced to death for the murder of their children under eight years, and subsequently reprieved in the period from Jan. 1st, 1927, to Dec. 31st, 1936:—

Year.	Age of child victim.	Year.	Age of child victim.
1927 (Case 1) ..	6 months.	1933 (Case 2) ..	20 months.
„ (Case 2) ..	1 month.	1934	1 month.
„ (Case 3) ..	2 years.	1936 (Case 1) ..	17 months.
1930	2 months.	„ (Case 2) ..	5 „ (twins).
1931	9 „	„ (Case 3) ..	12 months.
1932	3 „	„ (Case 4) ..	4 „
1933 (Case 1) ..	18 „		

Free Meals for School-children

Mr. SANDYS asked the Parliamentary Secretary to the Board of Education how many local education authorities still made no provision for the supply of free solid meals to children.—Mr. KENNETH LINDSAY replied: One hundred and seventy-two local education authorities make no provision for the supply of free solid meals.—Mr. SANDYS: What is being done to encourage them to make this provision?—Mr. LINDSAY: I think that those figures need careful examination. For example, there are only three county boroughs where the authorities supply neither free milk, nor free solid meals. In regard to the counties there are obvious difficulties to be overcome, which are being negotiated by the extension of senior schools with canteens. In addition the Board is encouraging local education authorities to conduct nutrition surveys, with good results.—Mr. LEACH: Are these places which refuse to operate the Act mostly cathedral cities?—Mr. LINDSAY: On the whole they are residential watering places and market towns.

Viscountess ASTOR: Would the Parliamentary Secretary remind these education authorities of the words of the chief medical officer of the Board who says that one cannot expect an undernourished child to derive benefit from physical exercises?

Miss RATHBONE: Is the Parliamentary Secretary aware that there are under 2 per cent. of the child population of the schools in receipt of school meals on any one day?

Mr. LINDSAY: We might be told that that is a good sign.

Approved Societies and Benefits

Mr. JAMES GRIFFITHS asked the Minister of Health if he was aware of the growing concern felt by a large number of the smaller approved societies operating under the National Health Insurance Acts at the loss of membership to the larger and richer societies, who were able to offer inducements to insured persons to transfer because of the wider range of additional benefits offered; and if he would now inquire into the possibilities of coördinating the health insurance services so as to ensure that all those who made equal contributions should secure equal benefits under the State insurance scheme.—Sir KINGSLEY WOOD replied: I cannot agree that the smaller approved societies are ordinarily at any disadvantage as compared with the larger societies as regards the additional benefits which they are able to provide for their members. Insured persons have freedom of choice of society and it is only to be expected that some will seek to transfer from societies with relatively unfavourable valuation results to others in a more favourable position. There is, however, already statutory provision for the protection of the weaker societies against undue loss of membership by transfer and the position is not, in my opinion, such as to call for the course suggested by the hon. Member, which would involve, amongst other consequences, the abolition of the approved society system.

Mr. GRIFFITHS: Does not the right hon. gentleman think that it is desirable and even necessary that those who contribute equally to a scheme of this kind should get equal benefits, quite apart from the effect of this disparity of additional benefits on the smaller societies and upon those who remain loyal to the smaller societies; and does he not think that the time is opportune to make a complete inquiry into the possibility of establishing a coördinated scheme which will give equal benefits to everybody?

Sir KINGSLEY WOOD: No, Sir. Because a society is small it need not necessarily have a bad experience. Often the difference, as far as the small societies and the large societies are concerned, is very small.

Standard Tests for Water-supplies

Mr. CHORLTON asked the Minister of Health whether he was yet able to give an indication of what he proposed to do with regard to standardising the tests necessary for public water-supply, whether it be by company or local authority.—Sir KINGSLEY WOOD replied: I hope shortly to issue a circular to local authorities on the question of the safeguarding of water-supplies.

Typhoid Fever in Somerset

Sir FRANCIS FREMANTLE asked the Minister of Health how many deaths had occurred in the outbreak of typhoid fever in the county of Somerset; and to what cause the outbreak had been traced.—Sir KINGSLEY WOOD replied: I regret to say that there were seven deaths. The evidence is that the outbreak was due to the consumption of foodstuffs which had been infected by an individual who was suffering from a condition which had not been diagnosed.

Dr. HADEN GUEST: Was the foodstuff milk? Sir KINGSLEY WOOD: No; I do not think so.

Diabetic Candidates for the Civil Service

Mr. MCENTEE asked the Secretary to the Treasury whether, in view of the successful results achieved by the use of insulin in the treatment of diabetics, he would now amend the regulations debarring those suffering from diabetes from entry into the public services.—Colonel COLVILLE replied: There is no actual regulation debarring those suffering from diabetes from entry to the Civil Service; the existence of this disease is, however, a factor which has to be considered in the medical examination which is undergone by candidates for entry to, or establishment in, the public service. Each case is decided on its merits by the appropriate authority, in the light of the medical report. Since it has to be considered not only whether the candidate is at present fit for the duties of the post he seeks, but also whether he will remain so till the age of retirement, this decision must often be adverse in spite of the efficacious treatment available to-day.

MONDAY, MARCH 14TH

Imports of Cod-liver Oil

Mr. ROBERT GIBSON asked the President of the Board of Trade what were the imports of cod-liver oil from Norway for the years 1929 and 1937; and if he had any statement to make thereon.

Captain WALLACE, Parliamentary Secretary to the Board of Trade, replied: Total imports into the United Kingdom

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of cod-liver oil consigned from Norway amounted to 1894 tons during 1929 and to 383 tons during 1937. Since the duty of 1*s.* 4*d.* per gallon was imposed on foreign cod-liver oil under the Ottawa Agreements Act, 1932, imports from Newfoundland have increased and there has been a substantial development of United Kingdom production.

Treatment at Roehampton Hospital

Mr. SORENSEN asked the Minister of Pensions how many pensioners were still receiving medical or hospital treatment at Roehampton and elsewhere; whether he was aware that many of such patients lost their employment in consequence of constant or prolonged interruptions of employment due to this necessary treatment; whether he would see that the charge of 19*s.* for treatment at Roehampton was reduced; and whether he would only charge patients up to the day of discharge and not for any period subsequent thereto.—Mr. H. RAMSBOTHAM replied: The number of in-patients in Roehampton and other hospitals (apart from mental hospitals) is 2128. Arrangements have been made, in conjunction with the Minister of Labour, by which patients in all Ministry hospitals who are unable to return to their former employment may, a week before their discharge, notify the employment exchange of their district and so receive prior consideration for fresh employment. The allowances which are payable in addition to free treatment are, under the terms of the Royal warrant, at fixed weekly rates and are paid weekly in advance. Adjustments between allowances and pension on a daily basis would not be administratively practicable.

TUESDAY, MARCH 15TH

Sick Accommodation in Troopships

Mr. DE LA BÈRE asked the Secretary of State for War, in connexion with the improved accommodation on transports for trooping, what steps were being taken to provide improved accommodation for the sick.—Mr. HORE-BELISHA replied: The hospital accommodation in a transport provides both for invalids from stations abroad, and for cases of sickness arising on the voyage. In the newer transports—namely, the *Dilwara* and *Dunera* and the two under construction—the cubic space for each individual has been increased. Improved types of bed and cot and better ventilation and lighting arrangements have been installed. The dispensaries are larger, and facilities for microscopic work have been provided. Several other kinds of improvement have also been adopted, such as refrigerators instead of ice-chests, proper cot-lifting units, and so on. The women's wards are similarly improved, and a separate medical inspection room for women has been provided. In the older transports higher standards of comfort and equipment have been provided as far as the accommodation will allow.

Grants for Veterinary Research in Scotland

Mr. ANSTRUTHER-GRAY asked the Home Secretary by what amount and in what way Scotland had benefited from the distribution of profits by the Racecourse Betting Control Board.—Mr. GEOFFREY LLOYD, in reply, said that grants had been made by the Racecourse Betting Control Board for the following, among other, objects specifically connected with Scotland: £1000 to investigations into grass sickness at the Institute of the Animal Diseases Research Association at Moredun, near Edinburgh. A further grant of £750 had been approved. £625 to research into disabling diseases of horses at the Royal (Dick) Veterinary College, Edinburgh. A further grant of £650 had been approved. £500 to the building fund of the Royal (Dick) Veterinary College, Edinburgh. A further grant of £500 had been approved. It was proposed to make a grant of £500 to the Glasgow Veterinary College.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MARCH 5TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 2 (Port of London, Leighton Buzzard); scarlet fever, 2367; diphtheria, 1556; enteric fever, 16 (29 "expected"); pneumonia (primary or influenzal), 1294; puerperal pyrexia, 193; cerebro-spinal fever, 50; acute poliomyelitis, 6; acute polio-encephalitis, 1; encephalitis lethargica, 3; dysentery, 155; ophthalmia neonatorum, 118. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on March 11th was 5386, which included: Scarlet fever, 840; diphtheria, 1275 (carriers 42); measles, 1892; whooping-cough, 271; puerperal fever, 15 mothers (plus 10 babies); encephalitis lethargica, 284; poliomyelitis, 1. At St. Margaret's Hospital there were 32 babies (plus 14 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox or enteric fever, 44 (14) from measles, 8 (0) from scarlet fever, 26 (2) from whooping-cough, 50 (8) from diphtheria, 56 (19) from diarrhœa and enteritis under two years, and 57 (6) from influenza. The figures in parentheses are those for London itself.

Birkenhead reported 4 fatal cases of measles, Liverpool 3. Liverpool also had 8 deaths from whooping-cough, no other great town more than 1. Diphtheria was fatal in 27 great towns, Liverpool reporting 9 deaths, Birmingham 3.

The number of stillbirths notified during the week was 267 (corresponding to a rate of 38 per 1000 total births), including 28 in London.

THE LANCET 100 YEARS AGO

March 17th, 1838, p. 908.

From a leading article on the confusion created by the host of licensing medical institutions.

The sick are not left to determine, by their own judgments whether an individual is qualified or not to treat their diseases. Chartered companies pretend to solve this question for the sick, and even to express different degrees of qualification. As gold, silver, and copper coin is stamped at her MAJESTY'S Mint, for the public convenience, so are there examined, stamped, and authorised physicians, surgeons, and apothecaries. But the physicians, surgeons, and apothecaries are examined at 19 different places; the examiners are irresponsible; they have 19 entirely different tests and standards; and things of different value are stamped with the same title; and that which is called apothecary here, is called physician or surgeon there; those that pass current in one district are called counterfeits in another. . . .

If no examining bodies existed, and no titles were bestowed, errors would be committed; but they would neither be so fatal, nor so flagrant, as the errors into which the public are systematically led by 19 Examining Boards. This is exemplified by a fable, for which the reader may, if he please, refer to LA FONTAINE. One fine day in summer, a Norman bonne was walking with a boy, ten years old, in the *Jardin des Plantes*. She had just observed that the names of all the animals were written on labels, when they arrived at an enclosure on which the boy read "Zebra." "Ah!" he exclaimed, "that is not like the streaked zebra in my spelling-book; it is of a dusky brown, and the very image of an ass." He was right; it was a foreign species of the ass, but an ass in every particular. The label had been misplaced. His guide, however, bade him look at the dark streak across the shoulders, and insisted that the ass was a zebra. The animal brayed, and the boy recognised an ass in the bray; but the preceptress persisting in her infallibility, went on to say:—"Child, believe me, this is a zebra—read the name—it is written and placed here by learned men appointed expressly for the purpose by the King." Several other errors arose in a similar manner, for on that day the labels had been accidentally as much misplaced as if nineteen Examining Boards had been employed to manage them; but we can only add, that much ingenious argument was used, to show that the same animal, called by three names by naturalists, was three essentially different animals. The moral need not be added, it is our argument.

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MEDICAL NEWS

University of Oxford

Rolleston memorial prize.—This prize, which is of the value of about £100, is awarded every two years for original research in animal and vegetable morphology, physiology and pathology, or anthropology. Memoirs already published may be submitted and graduates or research students of the Universities of Oxford and Cambridge are eligible. Further information may be had from the registrar of the university to whom essays should be sent before March 31st.

Radcliffe prize.—The next award of this prize, which is of the value of £50, will be made in March, 1939. It is awarded for research in any branch of medical science and is open to all graduates of the University who are proceeding to a medical degree in the University. Further information may be had from the Secretary of Faculties, University Registry, Oxford.

Dr. W. E. Henley, second assistant to the medical unit of St. Mary's Hospital, has been elected to a fellowship on the foundation of Dr. John Radcliffe.

University of Cambridge

On March 11th the following degrees were conferred :—

M.D.—Stuart McDonald, K. M. A. Perry, Joseph Smart, and V. H. Riddell.

M.Chir.—W. F. Nicholson.

M.B., B.Chir.—*A. L. Cochrane, *G. R. Rawlings, *J. K. Moore, R. L. Townsend, and David Rubin.

* By proxy.

Royal College of Surgeons of England

A meeting of the council of the college was held on March 10th, with Sir Cuthbert Wallace, the president, in the chair. Mr. C. P. G. Wakeley was re-elected a member of the court of examiners, and it was reported that Mr. P. B. Ascroft had been reappointed a Streatfeild research scholar for a second year.

It was decided that the University of Hyderabad should be recognised as a school at which the study for the primary examination for the fellowship might be taken.

Diplomas of fellowship to the following candidates :—

R. C. Percival, L.R.C.P. Lond.; G. L. Bohn, M.B. Lond.; H. R. Pasricha, M.B. Punjab; I. E. Zieve, L.R.C.P. Lond.; J. A. Dhacka, M.B. Bombay; D. M. Jones, M.B. Lond.; J. H. Mayer, M.B. Lond.; R. G. Talwalkar, M.B. Bombay; Eric Vernon, M.D. Manch.; Margaret M. Ferguson, M.B. Manch.; R. H. Karmarkar, M.B. Bombay; M. N. Khanna, M.B. Punjab; T. D. V. Krishnan, M.B. Madras; R. S. Lawson, M.B. Melb.; J. F. Shepherd, M.B. Aberd.; Marcel Sofer Schreiber, M.B. Sydney; and S. P. Srivastava, M.B. Lucknow.

A diploma of membership was granted to Robert Cox of Westminster Hospital, and licences in dental surgery were granted to the following candidates :—

Sydney Ackers, Ernest Allen, J. A. Avasia, Dorothy M. Bateman, R. A. C. Battson, Paul Borghys, T. P. Bromley, C. F. H. Bulow, P. A. Chandler, C. A. Chaundy, G. F. Daws, F. D. Ford, J. H. French, P. H. F. Gaskell, G. H. Gibbs, Samuel Goldman, Minnie E. Gregg, J. B. Hardie, R. W. Harvey, J. R. Holmes, Ruth W. Jenkins, J. R. Kempe-Roberts, P. D. Law, D. F. Mace, N. H. McLellan, A. H. Millett, P. B. Myers, R. D. Ogston, A. E. Parrott, J. W. R. Payne, R. C. Price, A. S. Rowe, C. A. Sabine, W. W. Saleeby, D. G. Sharp, Murray Shaw, A. J. Sheldon, W. B. B. Southwell, J. J. Spencer, George Sperryn-Jones, P. D'E. Spooner, G. C. Sprigings, Cyril Squire, D. D. Stalford, E. D. Stanhope, G. P. L. Taylor, R. H. Thoseby, J. H. D. Tobin, F. G. Triay, J. W. Truscott, B. F. Vellender, G. W. Vincent, N. C. Ward, Howard Williams, R. B. Wise, and Tony Wolf.

Diplomas in ophthalmic medicine and surgery were granted jointly with the Royal College of Physicians to the following candidates :—

G. H. Appel, A. H. Booth, D. K. Bose, G. H. Buck, E. W. B. Griffiths, S. P. Gupta, A. G. Hiremath, Jacob Joels, J. B. d.S. Karki, H. O. Little, John Macaskill, N. C. Mandalia, J. D. Martin-Jones, T. R. Pahwa, J. B. Patrick, Henry Penman, C. V. D. Rose, E. N. Rosen, Richard Stuart, R. A. Syed, and Simon Wigoder.

Society of Radiographers

This society is holding a mock trial at the Cowdray Hall, 1A, Henrietta-street, London, W., on Saturday, March 19th, at 7 P.M., when the action of Martin *v.* The Northside Hospital and Violet Wray will be tried. Further information may be had from the secretary of the society, 32, Welbeck-street, London, W.1.

Dr. Burgess Barnet, who was curator of reptiles at the London Zoo from 1932 till last June, has been appointed superintendent of the zoological gardens at Rangoon.

International Hospital Association

Mr. W. McAdam Eccles has been appointed chairman of the United Kingdom Council of this association in succession to Mr. H. L. Eason, who resigned last year.

Royal Sanitary Institute

A meeting of the Institute will be held at Yeovil on Friday, April 8th, at 5 P.M., when Sir William Savage will open a discussion on milk and pasteurisation. Further information may be had from the secretary of the Institute, 90, Buckingham Palace-road, London, S.W.1.

Harveian Society of London

The subject for the Buckston Browne prize essay for 1939 is the value of periodic medical examination in the detection of disease in middle life. The prize, which consists of a medal and £100, is open to any member of the medical profession registered in the British Isles or Dominions who is under 45 years of age. Essays must be sent to Mr. C. P. G. Wakeley, 14, Devonshire-place, London, W.1, before Oct. 1st, 1939.

Maternity and Child Welfare Conference

A national conference on maternity and child welfare will be held at the University of Bristol on July 5th, 6th, and 7th, under the presidency of Mr. R. H. Bernays, M.P. The main subject for discussion will be the child of the future. The conference is being organised on behalf of the National Council for Maternity and Child Welfare by the National Association of Maternity and Child Welfare Centres and for the Prevention of Infant Mortality. Further information may be hade from the hon. secretary, Carnegie House, 117, Piccadilly, London, W.1.

Union Thérapeutique

The annual meeting of this body will be held in Paris on Oct. 12th under the presidency of Prof. Loeper. Papers will be read by Prof. Dautrebande (Liége) on oxygen-therapy, by Prof. Singer (Vienna) on protein therapy in diabetes, by Prof. Hernando (Madrid) on the use of vitamins in the treatment of diseases of the digestive organs, by Prof. Buergi (Berne) on chlorophyl and cutaneous lesions, and by Prof. Henri Benard and Dr. Sallet (Paris) on continuous intravenous injections. A joint session with the Société de Thérapeutique de Paris will also be held when the principal subject for discussion will be the therapeutic use of sulphur. The speakers will include Prof. Buergi, Prof. Knud Schroeder (Copenhagen), Prof. Léon Binet (Paris), Prof. Campanacci (Parma), and Dr. Louis Bory (Paris). Further information may be had from the secretary-general, 24, rue de Téhéran, Paris VIII.

Appointments

ALDRIDGE, A. G. V., M.B. Camb., Resident Medical Officer at the Children's Hospital, Birmingham.

BARBER, H. STUART, M.B. Dubl., M.R.C.P., Medical Registrar at the Prince of Wales's General Hospital, London.

BRAITHWAITE, J. V., M.D., M.R.C.P. Lond., Consultant Physician to the Kettering and District General Hospital.

*CLARK, W. G., M.B. Glasg., D.P.H., Medical Officer of Health for Edinburgh.

DRURY, JOAN C., M.B. Camb., Assistant Pathologist at the Swansea General and Eye Hospital.

FORGAN, EVELYN J., M.B. Lond., Temporary Medical Registrar at the Elizabeth Garrett Anderson Hospital.

HARDY, ROBERT, M.B. Edin., D.P.H., Assistant School Medical Officer for Newcastle-upon-Tyne.

LASK, SAMUEL, M.B. Leeds, Assistant Medical Officer at Preston Hall Sanatorium, near Maidstone.

MILLER, ARTHUR, F.R.C.S. Edin., D.L.O., Consulting Otologist to the Ealing School Medical Service.

PARSONS, CLIFFORD, M.B. Camb., M.R.C.P. Lond., Receiving-room Officer at the Children's Hospital, Birmingham.

STOTT, ARNOLD, B.Chir. Camb., F.R.C.P. Lond., Physician to the Westminster Hospital.

* From October next.

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Vacancies

For further information refer to the advertisement columns

Accrington Borough.—Deputy M.O.H. and School M.O., £500.
Ashton-under-Lyne, Lake Hosp. and Darnton House Institution.—Sen. and Jun. Res. M.O.'s, £250 and £225 respectively.
Barking Borough.—Asst. M.O., £600.
Battersea General Hosp., Battersea Park, S.W.—Hon. Radiologist.
Bechuanaland, Scottish Livingstone Hosp., Molepolole.—Doctor-Missionary.
Bedford County Hosp.—H.S., at rate of £155.
Birmingham Maternity Hosp.—H.S., at rate of £75.
Birmingham Royal Cripples Hosp.—Res. H.S., at rate of £200.
Birmingham, Selly Oak Hosp.—Res. Physician, £650.
Birmingham and Midland Eye Hosp.—H.S., at rate of £130.
Blackburn County Borough.—Asst. M.O.H. and Asst. School M.O., £600.
Bradford Royal Infirmary.—Five H.S.'s, each at rate of £150.
Brighton, Royal Sussex County Hosp.—Cas. H.S., £120.
Bristol, Barrow Hosp.—Second Asst. M.O., £400.
Bristol City and County.—Asst. M.O.H., £500.
Bristol Dispensary.—Medical Officer.
British Postgraduate Medical School, Ducane-road, W.—First Asst. in Dept. of Surgery, £250–£500.
Cambridge, Addenbrooke's Hosp.—H.P., H.S. to Spec. Dept., and Res. Anæsthetist and Emergency Officer, each at rate of £130.
Central London Throat, Nose, and Ear Hosp., Gray's Inn-road, W.C.—Reg. and Clin. Tutor, £300.
Charing Cross Hosp., W.C.—Cancer and Radium Registrar, £100.
Chester Royal Infirmary.—Two H.S.'s, each £150.
Derbyshire County Council.—Asst. Maternity and Child Welfare M.O., £600.
Derbyshire Royal Infirmary.—H.S. for Ear, Throat, and Nose Dept., £150.
Doncaster Royal Infirmary and Dispensary.—Hon. Orthopædic Surgeon, £250.
Dorset County Council.—County Pathologist, £750.
Dundee Mental Hosp., Westgreen.—Jun. Asst. M.O., £300.
Durham County Council.—Temp. Asst. M.O.H., £600. Also Asst. Welfare M.O., £500.
Durham County Mental Hosp.—Locum Tenens Asst. M.O., 1 guinea per day.
Eastbourne, Princess Alice Hosp.—Res. H.S., £150.
Elizabeth Garrett Anderson Hosp., Euston-road, N.W.—Clin. Asst. to Ophthalmic Dept. Out-patients, £50.
Essex Administrative County.—Asst. Specialist Ophth. Surgeon, £700.
Evelina Hosp. for Sick Children, Southwark, S.E.—H.S., at rate of £120.
Glasgow Eye Infirmary.—Res. H.S., £150.
Grimsby Corporation Hosp. and Sanatorium.—Res. M.O., £350.
Halifax Royal Infirmary.—Res. Surg. O., £250. Also H.S.'s, at rate of £200, £175, and £150 respectively.
Haywards Heath, Brighton County Borough Mental Hosp.—Third Asst. M.O., £350.
Herefordshire General Hosp.—H.S. to Spec. Depts., £100.
Hertfordshire County Council.—M.O. for Maternity and Child Welfare Work, £500.
Hosp. for Epilepsy and Paralysis, Maida Vale, W.—Res. M.O. and H.P., at rate of £150 and £100 respectively.
Hosp. for Sick Children, Great Ormond-street, W.C.—Res. Med. Supt. and Out-patient Aural Registrar, £200 and £175 respectively. Also two H.P.'s and two H.S.'s, each at rate of £50.
Hosp. of St. John and St. Elizabeth, 60, Grove End-road, N.W.—Res. H.S., at rate of £75.
Hove General Hosp.—Jun. Res. M.O., at rate of £120.
Huddersfield County Borough.—Asst. M.O.H., £500.
Hull Royal Infirmary.—Second H.P., at rate of £150.
Ilford, King George Hosp.—H.S., at rate of £100.
Inverness, Royal Northern Infirmary.—Med. Supt., £500.
Ipswich, East Suffolk and Ipswich Hosp.—Cas. O., £144.
King Edward Memorial Hosp., Ealing.—H.S., at rate of £150.
Leicester City Mental Hosp.—Asst. M.O., £350.
Lincoln City Hosp. and Sanatorium.—Res. M.O., £300.
London Chest Hosp., Victoria Park, E.—H.P., at rate of £100.
London County Council.—Radiologists, each £900. Obstetrician and Gynæcologist, £800. Second Asst. M.O., £625. Two Asst. M.O.'s, each £600. Sen. Asst. M.O. (Grade II), £500. Asst. M.O.'s (Grades I and II), £350 and £250 respectively. Part-time M.O.'s, each £300. Also Anæsthetists, each £125.
London Hosp., E.—Anæsthetist to Dept. of Neurosurgery, £250. Also Clin. Asst. in X Ray Dept., £100.
London University.—Sir Henry Royce Research Fellowship, £500.
Maidstone, West Kent General Hosp.—H.S., £175.
Manchester, Ancoats Hosp.—Res. Surg. O., £200.
Manchester Royal Infirmary.—M.O. to Out-patients, £105.
Manchester and Salford Hosp. for Skin Diseases.—H.S., at rate of £150.
Medical Research Council, 38, Old Queen-street, S.W.—Kathleen Schlesinger Research Fellowship, £300.
Middlesex County Council.—Tuberculosis M.O., £750.
Mount Vernon Hosp., Northwood.—H.S., £150.
National Temperance Hosp., Hampstead-road, N.W.—Cas. O., at rate of £120.
Newcastle-upon-Tyne, Royal Victoria Infirmary.—Jun. Gynæcologist and Obstet. Registrar, and Asst. to Radiological Dept., each £300. Also Registrar to Orthopædic Dept., £150.
Nottingham General Hosp.—H.P., at rate of £150.
Oxford University.—First Asst. in Dept. of Clin. Medicine, £600.
Oxford, Wingfield-Morris Orthopædic Hosp., Headington.—H.S., at rate of £100.
Oxted and Limpsfield Cottage Hosp.—Hon. Ear, Nose, and Throat Surgeon.
Paddington Green Children's Hosp., W.—H.P. and H.S., each at rate of £150.
Plymouth, Prince of Wales's Hosp.—Asst. Pathologist, £500. Also Jun. H.S., at rate of £120.
Portsmouth and Southern Counties Eye and Ear Hosp.—H.S., £150.
Preston, Biddulph Grange Orthopædic Hosp.—Asst. Visiting Orthopædic Surgeon, £250.
Preston, Sharoe Green Hosp.—Jun. Asst. Res. M.O., at rate of £100.
Princess Beatrice Hosp., Earl's Court, S.W.—Hon. Clin. Assts. to Out-patients' Dept.
Queen Charlotte's Maternity Hosp., Marylebone-road, N.W.—Sixth M.O. for Antenatal Dept.
Richmond Royal Hosp., Surrey.—Sen. and Jun. H.S.'s, £150 and £100 respectively.
Rotherham Hosp.—H.P., £180.
Royal Free Hosp., Gray's Inn-road, W.C.—Res. Cas. O., £150.
Royal London Ophthalmic Hosp., City-road, E.C.—Out-patient Officer, £100.
Royal Naval Dental Service.—Dental Officers.
Royal Naval Medical Service.—Medical Officers.
St. Bartholomew's Hosp., E.C.—Part-time Chief Asst. in X Ray Diagnostic Dept.
St. George's Hosp., S.W.—Physician. Also Asst. Physician.
St. Mary's Hosp., W.—Med. Reg., £200.
Salisbury General Infirmary.—H.S., at rate of £125.
Salop County Council.—Asst. M.O., £500.
Sheffield Royal Infirmary.—H.S. to Ear, Nose, and Throat Dept., at rate of £80.
South Eastern Hosp. for Children, Sydenham, S.E.—Res. M.O., at rate of £100.
South London Hosp. for Women, Clapham Common, S.W.—H.P., at rate of £100.
Southend-on-Sea General Hosp.—H.P. and H.S., each at rate of £100.
Stockport, Stepping Hill Hosp.—Res. Asst. M.O., £350.
Stoke-on-Trent, Burslem, Haywood, and Tunstall War Memorial Hosp.—Res. H.S., at rate of £175.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—Res. Anæsthetist, £150.
Surrey County Council.—Asst. M.O., £600.
Swanley, Kent, Alexandra Hosp. for Children with Hip Disease.—Second Res. M.O., at rate of £250–£300.
Tavistock Clinic, Malet-place, W.—Diagnostic Physician, £50.
Tunbridge Wells, Kent and Sussex Hosp.—Sen. H.S., £150.
Walsall General Hosp.—Asst. Hon. Surgeon to Ear, Nose, and Throat Dept.
Westminster Hosp., S.W.—Asst. Physician.
Wimbledon Hosp., Copse Hill, S.W.—Res. M.O., at rate of £150.
Windsor, King Edward VII Hosp.—H.S. and Cas. O., each £120.
Wolverhampton, New Cross Hosp.—Res. Asst. M.O., £200.
Woolwich and District War Memorial Hosp., Shooters Hill, S.E. Res. M.O., £150. Also H.S., at rate of £100.
Worcester County and City Mental Hosp.—Asst. M.O., £350.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Denton (Lancaster), Anstey (Leicester), Andover (Southampton, Hants), and Yaxley (Huntingdon).

Medical Referee under the Workmen's Compensation Act, 1925, for the Stafford, Lichfield, Tamworth, and Uttoxeter County Court District (Circuit No. 26). Applications should be addressed to the Private Secretary, Home Office, Whitehall, London, S.W.1, before April 5th.

Medical Diary

March 21st to March 26th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

WEDNESDAY.

Comparative Medicine. 5 P.M., Dr. G. M. Findlay and Dr. F. O. MacCallum: Hepatitis and Jaundice in Association with Immunisation against Certain Virus Diseases. Dr. H. P. Bayon: Diagnostic Avian Pathology in Relation to Poultry Diseases.

THURSDAY.

Urology. 8.30 P.M., Mr. Stanford Howard: (1) Carcinoma of Kidney. Mr. H. P. Winsbury-White: (2) Radiograms of Stricture of Ureter. Mr. R. H. Jocelyn Swan: (3) Coincident Hypernephromata of Kidney, Adrenal, and both Ovaries. (4) Metastasis in the Rectus Abdominis Muscle from Papillary Carcinoma of the Bladder. Mr. Kenneth Watkins: (5) Primary Papilloma of the Ureter. (6) Carcinoma of the Renal Pelvis and Ureter. (7) Carcinoma of Both Ureters, Secondary to Carcinoma of Bladder. (8) Carcinoma of Bladder with Obstruction at the Vesical Orifice and Extension up One Ureter. Mr. R. H. O. B. Robinson: (9) Teratoma of the Bladder. Mr. A. E. Roche: (10) Total Cystectomy.

FRIDAY.

Disease in Children. 5 P.M. (Cases at 4 P.M.), Mr. E. A. Freeman and Dr. J. H. Sheldon: (1–2) Craniocarpotarsal Dystrophy of ? Undescribed Type. Dr. Sheldon: (3) Calcinosis. Mr. R. Milnes Walker: (4–5) Pneumonectomy for Bronchiectasis. Dr. C. E. Field (introduced by Dr. Reginald Lightwood): (6) Cerebral Sequelæ after Neonatal Jaundice Ascribed to Kernicterus. Dr. A. Moncrieff and Dr. E. Davis: (7) Microcytic Anæmia Resistant to Treatment. Dr. T. Colver (for Dr. Wilfrid Sheldon): (8) Case for Diagnosis. Dr. G. H. Newns: (9) Boeck's Sarcoid in a

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Boy of 2 years. Dr. Newns: (*a*) Congenital Mitral Stenosis. (*b*) Acute Bacterial Endocarditis in an Infant.

Epidemiology and State Medicine. 8.15 P.M., Dr. R. W. Dodgson: Shell-fish and the Public Health (with film).

MONDAY.

Odontology. 8 P.M., Mr. S. A. Riddett: (1) Tumour of the Palate. Mr. Percival Cole: (2–4) Pedicle Bone Graft for Fractured Mandible. Mr. J. G. Turner: (5) Spread of Caries. (6) Enamel Hypoplasia. Mr. Frank Coleman: (7) Fracture of Mandible. (8) Cyst of the Mandible. (9) Extra Molar Tooth. Mr. H. O. Dickin: (10) Dental Models Illustrating Development under Treatment by Means of Oral Screens. Mr. F. N. Doubleday: (11) Widening of the Aperture of the Mouth. (12) Hypertrophic Gingivitis treated without Operation. Mr. A. L. Packham: (13) Unilateral Fibrous Ankylosis of Right Temporomandibular Joint in a Child of 8 years. Mr. W. Warwick James: (14) An Old Fracture of the Mandible. (15) Necrosis of the Mandible.

FRIDAY.

Anæsthetics. 8.30 P.M., Dr. C. L. G. Pratt: Some Physiological Points of Importance in Anæsthesia.

MEDICO-LEGAL SOCIETY.

THURSDAY.—8.30 P.M. (26, Portland-place, W.), Dr. S. W. Fisher: Medico-Legal Aspects of Coal Mining.

HUNTERIAN SOCIETY.

MONDAY.—8.30 P.M. (Simpson's Restaurant, 2, Bird-in-hand Court, 76, Cheapside), Mr. Norman Lake and Mr. John Hanby: Painful Feet.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.

FRIDAY.—8.30 P.M. (11, Chandos-street, W.), Mr. Aleck Bourne: Chronic Cervicitis.

ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS.

FRIDAY.—5 P.M. (London School of Hygiene, Keppel-street, W.C.), business meeting. 6 P.M., Dr. J. C. Bridge: First-aid in Factories. Mr. P. H. Mitchiner: Minor Surgery Applied to Industrial Medical Services.

SATURDAY.—10 A.M. (St. Thomas's Hospital, S.E.), Mr. P. H. Mitchiner: Practical Demonstration of Minor Surgery and Casualty Surgical Methods.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Thornhaugh-street, W.C.

Fever Hospital Medical Service Group.

FRIDAY.—4 P.M., Dr. V. D. Allison and Dr. Robert Cruickshank: The Streptococcal Infections as Ascertained by Type Determinations.

BRITISH PSYCHOLOGICAL SOCIETY.

Medical Section.

WEDNESDAY.—8.30 P.M. (1, Wimpole-street, W.), Dr. Margaret Lowenfeld: The World Pictures of Children.

EUGENICS SOCIETY.

TUESDAY.—5.15 P.M. (rooms of the Royal Society, Burlington House, Piccadilly, W.), Miss Evelyn Fox: Modern Development in Mental Welfare Work.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.

TUESDAY and THURSDAY.— 5 P.M., Dr. J. G. Greenfield: Recent Observations on the Morphology of the Neuron, and on the Changes which it Undergoes in Disease. (Oliver-Sharpey lectures.)

UNIVERSITY OF GLASGOW.

TUESDAY.—4.30 P.M. (Tennent Memorial Building, Church-street), Dr. John Marshall: Diseases of Eyelids, Conjunctiva and Cornea.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland-place, W.

WEDNESDAY.—3.30 P.M., Mr. Aleck Bourne: Influences which Undermine the Health of Women.

INSTITUTE OF PSYCHO-ANALYSIS, 96, Gloucester-place, W.

TUESDAY.—8.30 P.M., Dr. Edward Glover: Gastric and Circulatory Disturbances. (First of three lectures.)

INSTITUTE OF CHILD PSYCHOLOGY.

MONDAY.—6.15 P.M. (Friends House, Euston-road, N.W.), Mrs. Margaret Hay: Success in Middle Life. 8.15 P.M. Dr. Margaret Lowenfeld: Fulfilment in Life.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.

WEDNESDAY.—12 noon, clinical and pathological conference (medical). 2 P.M., Dr. T. H. Belt: The Pneumokonioses. 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Prof. Harington: The Thyroid and its Secretions.

THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration. 3.30 P.M., Mr. Wilfred Shaw: Irregular Uterine Hæmorrhage. 4.30 P.M., Mr. Kenneth Walker: Venereal Diseases.

FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. Geoffrey Keynes: Diseases of the Breast.

Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

ST. GEORGE'S HOSPITAL, S.W.

THURSDAY.—5 P.M., Dr. Desmond Curran: psychiatric demonstration.

NATIONAL HOSPITAL, Queen-square, W.C.

MONDAY.—3.30 P.M., Dr. Macdonald Critchley: Epilola.

TUESDAY.—3.30 P.M., Dr. F. M. R. Walshe: Progressive Muscular Atrophy.

WEDNESDAY.—3.30 P.M., Dr. Walshe: clinical demonstration.

THURSDAY.—3.30 P.M., Dr. Denis Brinton: Vascular Disease of the Nervous System.

FRIDAY.—3.30 P.M., Dr. E. A. Carmichael: The Cerebellar Degenerations.

Out-patient clinic daily at 2 P.M.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.

THURSDAY.—3 P.M., Dr. W. Russell Brain: clinical demonstration.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY.—2 P.M., Dr. Wilfrid Sheldon: Anæmias, Jaundice, and Hæmorrhages in the New-born. 3 P.M., Dr. D. B. Bradshaw: Prophylaxis of Diphtheria and Scarlet Fever.

Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL, N.W.

WEDNESDAY.—4 P.M., Dr. H. C. Semon: Some Aspects of Cutaneous Allergy.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

FRIDAY.—4 P.M., Mr. W. A. Mill: Ear-ache in the Normal Ear.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W.

TUESDAY.—5.30 P.M., Dr. Paul Wood: Congestive Heart Failure.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.

FRIDAY.—4.30 P.M., Dr. A. P. Cawadias: Physical Medicine in Metabolic and Gastro-Intestinal Diseases. (I.)

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY to SATURDAY.—ROYAL CHEST HOSPITAL, City-road, E.C., Mon., Wed., and Fri., 8 P.M., advanced course in chest and heart diseases. (Open to non-members.)—WEST END HOSPITAL FOR NERVOUS DISEASES, Welbeck-street, W., afternoon course in neurology.—PRESTON HALL, near Maidstone, Kent, Sat., demonstration on pulmonary tuberculosis.

LEEDS GENERAL INFIRMARY.

TUESDAY.—3.30 P.M., Mr. G. S. Seed: The Diagnosis and Treatment of Nasal Sinusitis.

MANCHESTER ROYAL INFIRMARY.

FRIDAY.—4.15 P.M., Mr. F. G. Wrigley, clinical demonstration.

ANCOATS HOSPITAL, Manchester.

THURSDAY.—4.15 P.M., Mr. E. S. Brentnall: Treatment of Fractures of the Neck of the Femur.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.

WEDNESDAY.—4.15 P.M. (Lock Hospital), Dr. David Watson: Venereal Disease in Women.

Births, Marriages, and Deaths

BIRTHS

FORMBY.—On March 15th, at Devonshire-place, W., the wife of Mr. Myles Landseer Formby, F.R.C.S. Eng.—a son.

FOSTER.—On March 6th, at Ancaster, Grantham, the wife of Dr. K. M. Foster—a daughter.

REES-JONES.—On March 9th, the wife of Dr. G. F. Rees-Jones, of Kelvedon—a daughter.

SANDELL.—On March 8th, at Sloane-street, S.W., the wife of Dr. David Sandell—a son.

THYNE.—On March 11th, at West Wimbledon, the wife of Dr. G. G. Thyne—a son.

MARRIAGES

DIVINE—SPEIRS.—On March 3rd, at St. Andrew's Cathedral, Singapore, Thomas A. Divine, M.B., to F. E. R. (Jane) Speirs, second daughter of Dr. H. M. Speirs, Diss, Norfolk.

DEATHS

BARTLETT.—On March 10th, at Southampton, Ralph Clarke Bartlett, M.R.C.S. Eng., formerly of Romsey.

CRAWFURD.—On March 9th, at a nursing-home, Sir Raymond Crawfurd, M.D. Oxon., F.R.C.P. Lond.

CUFF.—On March 9th, at Sheffield, Archibald William Cuff, M.B. Camb., F.R.C.S. Eng., J.P.

HAINES.—On March 15th, in London, John Finch Haines, M.D. R.U.I.

MANSELL.—On March 10th, at St. Leonards-on-Sea, Harry Rosser Mansell, M.R.C.S. Eng., aged 77.

PURKISS.—On March 10th, at Hastings, Arthur Purkiss, M.D. Aberd., in his 81st year.

TROUNCER.—On March 13th, at Benllech Bay, Anglesey, Charles Albert Trouncer, M.B. Camb., aged 71.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births Marriages, and Deaths.

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NOTES, COMMENTS, AND ABSTRACTS

EARLY MEDICAL BOOKS

ONE of the most interesting collections of rare books on medicine and surgery that have come on the market in recent years will appear at a London sale-room during April. It was mainly formed during the latter half of the seventeenth century by John Lawson, who was president of the Royal College of Physicians in 1685. At one time Oliver Cromwell sought to exercise his prerogative in order to have Lawson made a fellow of Queens' College, Cambridge, but the fellows of the college refused to admit him and this uncomplimentary proceeding may have had some bearing on the destination of Lawson's library, for on his death in 1705 he bequeathed it to Sion College. This cannot, even in those days, have been a very suitable gift, as Sion College library was designed for theological studies. In any case the excellent condition of the books shows that they were little studied by the fellows.

The great interest of the collection lies in its wealth of books by English medical writers of the sixteenth and the seventeenth century. There are first editions of Harvey's "De Motu Cordis," published at Frankfort in 1628, and of his "De Generatione Animalium," and works, sometimes signed presentation copies, by Glisson, Charleton, Boyle, Maynwaring, Sydenham, Gideon Harvey, and many others, including Banister and Vicary. Of these the first edition in English of Glisson's "Treatise of Rickets" is said to be the first monograph on a specific disease published in England. The great length of the title-pages in these old books is well shown in Thomas Bonham's "Chyrurgian's Closet, furnished with varietie and choyce of Apophlegms, Balmes, Baths, Caps, Cataplasmes, Cerots, Diets, Dentifrices, Gargarismes, Pils, Quilts, Suppositaries, Synapismes, Trochisces . . . , nowe drawne into Method and Forme for the helpe and ease of young Practitioners in the ancient, necessarie and noble Science of Chyrurgerie." Medical books bequeathed to Sion College during the hundred years or so after Lawson's death were also added to the library, and among these are the monographs of John and William Hunter.

Those responsible for the care of large libraries will endorse the decision of the president and governors of Sion College to dispose of this collection. It is much more likely to be kept in good repair in the future if acquired by medical institutions or collectors with a special interest in preserving these books and in making them accessible to students of medical history and literature.

A CASE OF SMALL-POX IN A SURGICAL WARD

THE recent arrival of a patient infected with virulent small-pox at one of our ports has recalled to Mr. T. B. Layton an incident which he records in his usual graphic style in the current issue of *Guy's Hospital Gazette*. One evening "some time ago" he was rung up by his house surgeon who reported the admission of a girl of sixteen with intense headache and a temperature of 104° F., presumably due to acute sinusitis. Next morning the girl was cheerfully sitting up in bed, without pain or pyrexia, and no abnormality was found in the nasal sinuses. Three days later, on a Sunday, the house surgeon, reporting some other case, remarked that the child had come out in an extraordinary rash which at first he had thought to be small-pox; but that one of the junior staff at the hospital had called it by the long name of some dermatological condition. Mr. Layton insisted that the person responsible for the diagnosis of small-pox in the area must see the case, and the medical officer of health for the area was therefore called in, agreed with the provisional diagnosis—something that ended with "exuditorans"—and gave reasons for his conviction that it was not small-pox. Two days afterwards the dermatologist was asked to see the patient and diagnosed small-pox. By this time it was a typical text-book case; when the medical officer of health came again he brought with him the small-pox expert on duty for the week, who till his retirement never ceased to remind Mr. Layton of the occasion when he kept a case of small-pox in the surgical ward of a general hospital for nearly a week. Fortunately only two contacts caught the disease and they were the only two whose vaccination was delayed by parental opposition. All the other contacts were vaccinated immediately the diagnosis had been established, and Mr. Layton comments on their escape as evidence of the value of vaccination after exposure. He draws other morals from this tale: one is that small-pox in its early stages can be mistaken for acute sinusitis; another is the value of the code generally adopted by members of the junior staff—of refusing to see a case under another firm without the knowledge of the head of the firm; and a third, that it is fatally easy to make a wrong diagnosis as a result of suggestion. No doubt, he suggests, the medical officer of health was met at the gate with apologies for taking him from his Sunday lunch to see a case whose diagnosis merely ended with exuditorans.

MEDICAL NEEDS IN THE UNITED STATES

BY way of answer to the complaint that their programme contains no constructive policy for bringing better medical care within the means of every citizen, the board of trustees of the American Medical Association recently adopted resolutions designed to encourage State and county medical societies to study the needs for medical services in their respective areas, and to formulate plans for meeting those needs in accordance with the established policies of the Association (see *Lancet*, Feb. 5th, 1938, p. 329). In collecting this information some uniformity of procedure was evidently desirable, and the *Journal* of the Association for Feb. 12th contains a suggested plan of study. Each society is recommended to appoint a special committee to collect information and it is emphasised that those responsible for its collection and analysis should have sufficient knowledge to appreciate the "values and processes in the practice of medicine." It is thought that some of the previous studies of the subject contain errors traceable to the work of non-medical persons without appreciation of the elements involved in the care of the sick. Each kind of medical service is to be studied from both the demand and the supply sides, and the completed report should "strike a balance." Information is to be obtained concerning private practice, hospitals, independent clinics (unconnected with hospitals), health departments, relief agencies—private and governmental—and educational institutions. The object of the study is to remove obstacles between patient and physician, whether arising from economic conditions, failure to appreciate the value of medical services, or definite deficiencies in the facilities available for medical care; and it is thought necessary that precise information should be obtained under each of these heads. Generally, the societies are urged:

"To determine as completely as possible the percentage of the persons in low-income classes receiving care from private and public agencies; the percentage of total services given by these agencies to the indigent and low-income groups; the extent to which tax-supported

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institutions accept patients who are able to pay full rates, and the number of individuals or families that have been denied medical services which they have sought. It is of equal importance to discover, if possible, the number of persons who presumably need medical services but have not attempted to obtain such services for the reason that they do not desire medical care. Furthermore, there may still be another group of persons who need and desire medical services but who, for reasons that should be discovered, fail to seek medical attention."

Prosecuted, as it doubtless will be, with characteristic American energy, this inquiry may well provide further valuable evidence of the requirements to be met.

GARDEN CITIES

THE essential idea of a garden city is that it is a self-contained social unit where people may both live and work. Planning beforehand defines the parts of the town which will be allotted to industry, homes, roads, open spaces, agriculture, or shops, and the owners of the land ensure that their plan is carried out. The garden city is bounded by a green belt which makes for health, limits the size of the town, provides small holdings, allotments, playing fields, and opportunities for country walks, and helps to bind the people of the town together. There is none of the usual expense of travelling to and from work; the people can have their meals at home and grow their vegetables in their own gardens. There are in this country two garden cities, Letchworth and Welwyn; a number of garden suburbs, of which Hampstead is the best known example; and one planned satellite town, Wythenshawe near Manchester. In a recent pamphlet (Health and Garden Cities) issued by the Garden Cities and Town Planning Association Dr. Norman Macfadyen gives some vital statistics of these towns. The death-rate in Welwyn is 5·9 per thousand, compared with 12 for England and Wales, the tuberculosis rate is 0·574 per thousand compared with 0·804, the infant mortality-rate is 25 compared with 62 for the whole country, and for some years Welwyn has had a birth-rate of 20. In Letchworth the days lost through illness every year by the members of a large friendly society are just over two per member, whereas in the whole of England and Wales they average about four. Dr. Macfadyen concludes that the conditions of life in a garden city are at present the healthiest in the country.

PNEUMOTHORAX FOR ECHINOCOCCAL CYSTS OF LUNG

IN *Policlinico* (sez. prat. Feb. 7th, 1938, p. 233) G. Roberti describes a case of echinococcal cyst of the lung successfully treated, under a mistaken diagnosis of tuberculosis, by artificial pneumothorax.

The patient, a youth of 18, was admitted to a sanatorium as having pulmonary tuberculosis, with a two months' history of cough, blood-stained expectoration, evening pyrexia, and general malaise. Examination revealed diminished resonance and distant breath-sounds all over the left upper lobe. Radiography showed a zone of opacity, oval in shape, and about the size of a hen's egg, at the upper part of the hilar region. The sputum contained no tubercle bacilli.

Three months after admission the symptoms and physical signs were unchanged despite the ordinary sanatorium treatment, and it was decided to induce pneumothorax. This was successfully done, as shown by subsequent radiography. Sixteen days later, to everyone's surprise, the patient coughed up a large fragment of chitinous membrane and a quantity of pus and blood. The latter was found on microscopic examination to contain scolices and hooklets. Casoni's test was strongly positive, and a blood count showed 6 per cent. of eosinophil cells.

The pneumothorax was maintained for eighteen months, during which time the cyst was by degrees completely expelled, with disappearance of the hilar shadow. It was then discontinued and the patient was discharged shortly afterwards in good health.

Roberti suggests that artificial pneumothorax deserves consideration as a method of treating echinococcal cyst of the lung in suitable cases—i.e., those in which surgical approach is especially difficult and there is good opportunity for drainage.

MILK CARTONS

FOR some years past attempts have been made to popularise the use of paper cartons for the delivery of milk to the consumer. Three independent firms are now manufacturing cartons in this country and several large dairies make their own from the flat just before filling them. Cartons have many advantages over glass bottles and have undoubtedly come to stay for certain classes of trade. Their saving in weight is considerable. A pint bottle weighs over a pound and a milk roundsman may therefore be called upon to carry 200 to 300 lb. of glass when the same milk could be taken in cartons weighing less than 20 lb. The fact that cartons are non-returnable, although it makes them considerably more expensive, saves time in collecting empties and makes them ideal for seaside and holiday trade; at the same time it eliminates the laborious task of bottle washing and the very real danger that may arise from improperly washed bottles. Tests conducted at the National Institute of Research in Dairying show that the containers supplied to dairymen ready for use are in a state of freedom from bacteria equal to the highest standard of cleanliness laid down for glass bottles; the majority are, in fact, sterile. Milk has also been shown to keep as well in cartons as in steam-sterilised bottles, and even after several days the cartons do not appreciably affect its flavour.

DISCLAIMERS

Count Castellani of Kisymaio writes in reference to articles which have recently appeared in various lay daily papers during his visit to America that he granted no interviews and the articles were published without his knowledge.

Dr. Geoffrey Konstam writes to say that the mention of his name and address in an article in a daily paper concerning an operation on a hospital patient was made without his knowledge or consent. The information was apparently given to the press by a member of the patient's family.

ORTHOPÆDIC NURSING

THE development of orthopædic hospitals and of orthopædic departments in general hospitals has called into being a new branch of nursing. A sister in charge of an orthopædic ward, and perhaps still more a nurse working at an orthopædic clinic, must have certain special knowledge to fit her for such work. In this country an attempt is being made by the Central Council for the Care of Cripples to meet this need by the holding of an examination for a special orthopædic certificate. Whether or not this is a desirable innovation is a matter of opinion, but it is certain that a reliable book on orthopædic nursing will help those who are working in hospitals or clinics. That by Dr. Earl McBride and Miss Winifred Sink,[1] now in its second edition, gives an excellent account of all that (and perhaps more than) an orthopædic nurse should be expected to know. It is written in a clear, easy style, and is well illustrated. It is somewhat of a shock to find a chapter devoted to hernia, but perhaps this is a gesture of respect to the venerable Hospital for the Ruptured and Crippled in New York City.

[1] Crippled Children: Their Treatment and Orthopedic Nursing. Second edition. By Earl D. McBride, B.S., M.D., F.A.C.S., Assistant Professor of Orthopedic Surgery, University of Oklahoma, in collaboration with Winifred R. Sink, A.B., R.N., Education Director, Grace Hospital School of Nursing, Detroit, Michigan. London: Henry Kimpton. 1937. Pp. 379. 18s.

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ADDRESSES AND ORIGINAL ARTICLES

CHRONIC MASTITIS *

BY H. J. B. ATKINS, D.M., M.Ch. Oxon., F.R.C.S. Eng.
ASSISTANT SURGEON TO GUY'S HOSPITAL

FOR the purposes of this paper "chronic mastitis" may be defined as any painful or nodular lesion of the breast not due to new growth, bacterial inflammation, or fat necrosis. Chronic mastitis is a very common but mysterious disease. We are almost entirely ignorant of its pathology, its life-history is only vaguely understood, and its treatment is unsatisfactory. Not only do we not know the cause of or the treatment for chronic mastitis, but the evidence on which the study of these two aspects of the disease must be based is so contradictory that it is difficult to present a picture of the disorder with as much as the broad outlines filled in.

It is probable that there is more than one cause of pain in the breast in chronic mastitis, it is possible that there is more than one cause of nodularity, and ever since the disease was first described till the present day, attempts have been made to classify different types of chronic mastitis from an ætiological, clinical, or histological point of view. Although a classification is desirable, none of the existing classifications is entirely satisfactory, and in any attempt at a too rigid classification there appears to be a danger of losing sight of the wood for the trees. Whilst admiring the work of Sir Lenthal Cheatle and Max Cutler (1931), I have been unable to convince myself of the truth of their main thesis, that there are two distinct types of chronic mastitis, the cystic (or cystophorous desquamative epithelial hyperplasia) and the non-cystic (or mazoplasia). Again, it is doubtful whether the histological division into epitheliosis and adenosis represents a real distinction between two separate entities. I shall therefore discuss the painful and nodular breast as a whole with what I hope is not a too ruthless disregard for the traditional avenues of approach.

THE CAUSES OF PAIN IN THE BREAST

Before discussing the causes of pain in chronic mastitis the question of differential diagnosis must be mentioned. At the mastitis clinic at Guy's Hospital cases of post-herpetic neuralgia, cholecystitis, and cardiac disease have been referred to me for treatment, and these conditions must be borne in mind. When such extraneous causes of pain can be excluded I believe that the following factors are usually concerned in varying proportions in different cases.

First, there is the *endocrine factor*. The evidence for this is that the pain occurs almost entirely in women, is often aggravated a few days before the menstrual period, and in most cases disappears during pregnancy. Further evidence in this direction is the effect, to be described later, of the injection of certain endocrine preparations.

Secondly, I suspect that there is what, for want of a better term, may be called a "*neuralgic*" *factor* in many of these cases of breast pain. Velpeau (1856) was the first to suggest this in so many words, and Astley Cooper (1829) observed the baneful effect of cold, damp weather. Many of my cases—though by no means all—have noticed this effect and proffer the information spontaneously. The distribution of the pain and tenderness is often suggestive of neuralgia, being along the course of one or two intercostal nerves; and any factor which might irritate these nerves, such as the drag of pendulous breasts, aggravates this pain. The therapeutic value of diathermy in many cases is possibly related to the neuralgic quality of the pain.

Lastly, there is the *psychological factor* which may cause sensations in the breast to be interpreted as pain, and pain in the breast to be interpreted as agony. All who have had to deal with chronic mastitis are impressed by the importance of the psychological aspect. Every woman knows that the breast is a common site for cancer. Sensations of some sort occur in the breast of most women at, or just before, the menses. In addition the normal breast feels different from the surrounding subcutaneous tissue, and the lateral border of the tail of the breast or the rolled suspended border often suggests a lump. Here then we have a ground upon which the seed of psychological pain is readily sown. My own impression of many of these patients is the same as that of Sir Astley Cooper (1829), that they are of an irritable and suggestive nature. The beneficial effect of reassurance is stressed by Velpeau (1856), and this again has been most pronounced in the cases with which I have had to deal.

In assessing the value of different methods of treatment I have resorted, as will be mentioned, to the injection of inert substances, such as olive oil, in a control series of cases, and the effect in some of them has been so remarkable as to suggest to anyone unaware of the composition of the material injected that it was a specific antidote for the disease.

CAUSE OF NODULARITY OF THE BREAST

The relation between nodularity and pain in the breast is by no means clearly understood. In an article on this subject published a few years ago such statements occurred as: "Out of 500 cases examined 144 showed nodularity of the breast." This statement is meaningless. Most breasts are nodular (compared with the surrounding subcutaneous tissue) although some are more so than others, and most breasts are more nodular at one period of the menstrual cycle than at another. It is, therefore, fruitless to consider such pronouncements as, "56 per cent. of painful breasts are nodular," or "19 per cent. of nodular breasts are painful," without defining what is meant by "nodular" with a degree of precision which is unattainable.

Numbers of patients complaining of pain in the breast show no greater degree of nodularity than other patients examined as controls not complaining of pain in the breast.

Mr. E. C. Hughes, my senior colleague at Guy's Hospital, has examined for me the breasts of fourteen patients, seven of whom were attending the mastitis clinic and the other seven were selected haphazard from the general medical wards. He was asked to say, from palpation of the breast, which patients he considered were attending the clinic. As a result of his examination he made a list in which the patients were placed in order of nodularity of the breast; the list was as follows (M. = attending the mastitis clinic, C. = control): M.; C.M.; M.; C.; C.; C.C.; M.; M.; M.; C.M.C.

In this small series it was thus impossible to judge from an examination of the breast which patient was likely to complain of symptoms. The implication is that nodularity is a normal property of breast tissue and that the predominant feature of chronic mastitis from the clinician's point of view is pain. Only those patients in whom the nodularity of the breast is exceptionally noticeable, either because it is

* Hunterian lecture delivered at the Royal College of Surgeons on Feb. 7th.

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excessive or because it is localised and forms a well-marked lump, will consult their doctor for lumpiness if pain be absent.

Despite this, my impression is that there is some relation between nodularity and pain in the breast; apart from those patients who come up complaining of lumpiness in the breast, I believe that the patients who complain of pain possess on the whole breasts which are more nodular than those who do not complain of pain. Nodularity and pain in the breast are associated, but not so closely or so regularly as is generally supposed.

The cause of nodularity in the breast is thought to be endocrine for the following reasons:—

It occurs almost exclusively in the female breast, it increases just before each menstrual period, and it is aggravated by the injection of certain endocrine preparations. It will be seen that the nodularity behaves in regard to hormonal effect very much as what we have called the endocrine factor in pain. That is, both are pronounced at the same period in the menstrual cycle and both are affected together by the injection of the same endocrine—the ovarian hormone œstrin. On these grounds it is believed that excess of œstrin, an abnormal quality of the œstrin elaborated, or an abnormal response on the part of the breasts to œstrin may be responsible for the nodularity and part of the pain in this disease. But because the injection of a certain substance aggravates a condition, it does not necessarily imply that it is the cause of it.

From these considerations it would appear that chronic mastitis is primarily an endocrine disorder; that this endocrine imbalance is responsible for structural changes in the breast and also for sensations which are either barely appreciated, mildly unpleasant, or painful, depending upon the extent to which the other pain factors are present. That some very nodular breasts are not painful is due, I believe, to the fact that the endocrine factor is the least important of the three pain factors, and where the other two are not operating the pain is absent or negligible.

IS CHRONIC MASTITIS PRECANCEROUS?

We now turn to the much debated problem of the possibility that the painful nodular breast is precancerous. Here there are three avenues of approach—the histological, the clinical, and the experimental; and there would seem to be an irreconcilable cleavage of opinion between the clinician on the one hand, and the histologist and experimental pathologist on the other regarding this problem. I shall deal first with the histological point of view, championed pre-eminently by Cheatle and Cutler (1931).

Briefly, the histological changes met with in the nodular breast are as follows: There is a hyperplasia and desquamation of the epithelial cells lining the ducts and some of the alveoli. The ducts dilate, coalesce, and form cysts. Into these cysts papillomatous processes of epithelial tissue may project. The interstitial fibrous tissue is increased and there is, into this tissue, an infiltration of small round cells. Cheatle and his school of histologists attempt to trace the life-history of the intracystic papillomatous projections, and they maintain that they can illustrate a complete series of events, starting with these innocent papillomata and ending with the appearance of malignant neoplastic cells (Figs. 1–9).

Such is the type of evidence upon which the histologist of this school maintains that mastitis is liable to lead to cancer. There are, however, two objections to this view. Firstly, histology takes a cross-section in the life-history of a group of cells and represents them in static form. There is no evidence that the order, chosen arbitrarily by the histologist, represents the sequence in the life-history of such cells. To take an extreme and somewhat absurd case, it might be argued equally that the normal breast develops from carcinoma by showing this series of photomicrographs in their reverse order. Secondly, even if this sequence be true, there is still no evidence that cancer cannot be grafted equally well on to the earlier stages of the sequence as the later. The histologist says in effect: "If cancer follows mastitis, this probably is the way in which it does so, and by showing you a possible way I have demonstrated that chronic mastitis is a possible precursor of cancer. More than this I cannot say."

When we consider the point of view of the clinician, we find among clinicians a remarkable agreement that chronic mastitis is not a precancerous lesion. In fact Bloodgood (1934), whose figures in relation to this point are more comprehensive than any others, began by studying mastitis as a histologist, and considered that it was a precancerous disease. When he observed mastitis from the clinical standpoint he completely changed his opinion and became one of the most ardent advocates of the view that the painful nodular breast was not potentially malignant. Bloodgood's series of many hundred cases of mastitis was followed up for a number of years, and he believed that the incidence of cancer of the breast in this series was not greater than the incidence in the general population. Later workers have supported these findings, and the impression of most surgeons of experience agrees with them.

There are objections to the deduction of final conclusions from the observations of Bloodgood and his school which must be mentioned. No reliable series has been followed up for more than ten years, and if cancer does appear after mastitis it does so probably after a longer period than this. Further, many of the cases in these series were subjected to operation for the removal of a localised lump—a lump in which the germ of cancer may have resided. Lastly, the clinician deals mainly with the breast which is predominantly painful, and we have seen that the relation between the painful breast and the nodular or structurally abnormal breast, with which the histologist deals, is by no means as close as has often been supposed. To this extent the clinician and the histologist are dealing with somewhat different material and are liable to come to different conclusions. For all that, the only reliable method of telling whether a disease A predisposes to a disease B is to take a large number of cases of A and follow them up for a long period, noting whether the disease B occurs in a greater proportion in these than in the general population. No indirect evidence however suggestive, from the histologist, can shake the validity of such an observation thoroughly carried out. It may be said that this observation has *not* yet been thoroughly carried out, for the reasons given above, and therefore we must say that scientifically we do not know whether the painful nodular breast predisposes to cancer. On the other hand, we can say fairly that sufficient of this type of evidence has been collected for us to assume that if this precancerous tendency does exist, it is so slight that there is no justification for removing the painful nodular breast—where the diagnosis of chronic mastitis is certain—in order to prevent the onset of cancer.

EFFECT OF ENDOCRINES ON THE BREAST

We come now to the work of the experimental pathologist. If the position outlined already has

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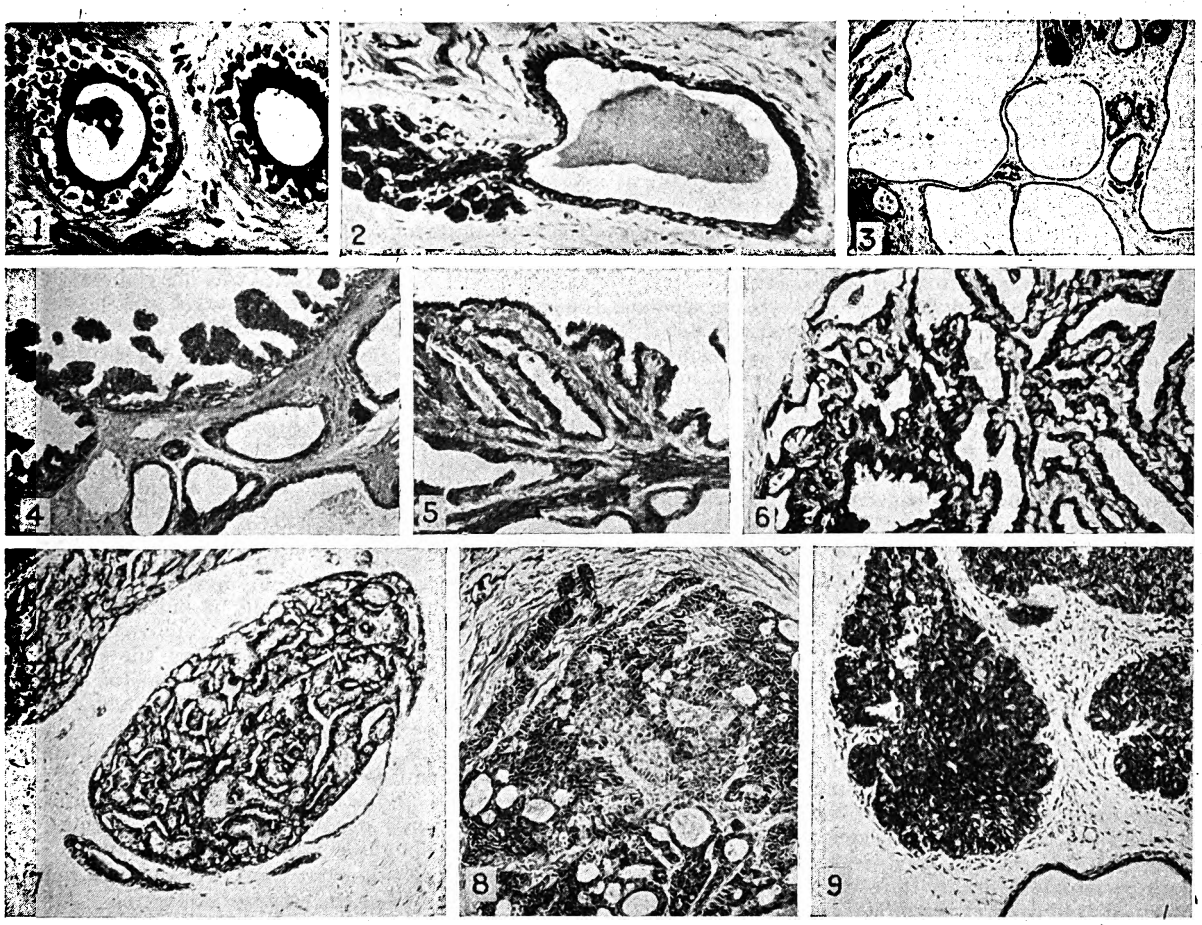

FIG. 1.—A number of ducts undergoing dilatation. The epithelial cells lining these ducts are elongated and are being shed into the lumen. The interstitial fibrous tissue is increased. (High power.)

FIG. 2.—A later stage. A dilated duct in communication with an unaltered alveolus contains the débris of desquamated cells. The lining of this duct is composed of epithelial cells which are becoming flattened. (Low power.)

FIG. 3.—A number of ducts have undergone dilatation. They are tending to coalesce. The epithelium is of the flattened "pavement" variety. (Low power.)

FIG. 4.—Papillomatous processes of epithelium project into some of the cysts. (Low power.)

FIG. 5.—Papillomatous projections have in places fused at their tips and form an arcade. The supporting stroma of these papillomata is increased. (Low power.)

FIG. 6.—The papillomata have grown towards the centre of the cyst and the fusion of their apices gives rise to the well-known "cart-wheel" arrangement. The cystic spaces are reduced to irregular clear areas between the epithelial projections. (Low power.)

FIG. 7.—From a patient complaining of bleeding from the nipple. A well-developed duct papilloma occupies nearly the whole of two cysts, the cystic spaces being reduced to mere slits. (Low power.)

FIG. 8.—A duct carcinoma in which the epithelial cells have crowded out almost all the other elements and there is a tendency for them to migrate into the surrounding tissue. (Low power.)

FIG. 9.—The cysts are crammed with spheroidal cancer cells to the exclusion of all other tissue elements. Part of an "empty" cyst is also shown. (Low power.)

seemed confused and contradictory, the work of the experimental pathologist has, if anything, made confusion worse confounded. This work is, however, of importance and must be taken into our reckoning.

The chemical structure of œstrin is very similar to that of the carcinogenic hydrocarbons, and it has been suggested that œstrin may therefore be carcinogenic—a hypothesis which finds certain support from experimental injection of œstrin into animals. On the other hand, progesterone and testosterone are in structure equally similar to the carcinogenic hydrocarbons, and so far neither of these substances has been shown to be carcinogenic experimentally. So that the argument, from structural analogy, that œstrin may be carcinogenic does not carry much weight.

The argument from the effect of œstrin injection into animals is, however, worthy of the closest examination.

This problem has been studied by Lacassagne (1932, 1933, 1934, 1936) and Burrows (1935). The effect of œstrin administration to mice and rats can be examined from two different though related standpoints: first, the contention that œstrin causes changes in the breast of experimental animals similar to those met with in mastitis in women, and secondly, that a prolonged administration leads to cancer. The difficulty in interpreting the results of these experiments, particularly the production of cancer by œstrin, lies in the fact that the effect is more obvious when male animals are used, and the problem arises as to whether œstrin does more than convert the male breast into a female one, and so render it liable to those changes which arise spontaneously in the female breast.

I shall deal with this difficulty first in relation to the alleged property of œstrin to cause mastitis. Burrows has established beyond all reasonable doubt that the administration of œstrin to male mice causes changes in the breast similar to those occurring in chronic mastitis in women. He states, however, that "Female mice have not been introduced very much into the discussion because there is not such a clear distinction to be seen in the mammæ of females

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between those treated with œstrogen and untreated controls. Observations have, however, been made on female mice, and no essential difference has been found between the results of persistent administration of œstrin to male and female mice respectively." Goormaghtigh and Amerlinck (1930), on the other hand, treated doe mice with a crude extract of œstrin, and claim to have produced cystic dilatation of the ducts and epithelial proliferation. A similar result in female mice is reported by Lacassagne (1936).

The weight of experimental evidence, therefore, supports the view that œstrin is capable, both in the male and female mouse, of producing changes similar to those met with in chronic mastitis in women. This is not to say that œstrin causes chronic mastitis in women. In these experiments relatively enormous doses of œstrin were used, so that if it were solely a question of œstrin excess causing mastitis, patients suffering from this disease would be expected to be found suffering also from other signs of gross œstrin poisoning, signs which they do not usually display. It is possible, however, that women suffering from chronic mastitis may either be elaborating a toxic product allied to œstrin or that their breasts are particularly sensitive to the action of normal œstrin.

In connexion with the problem of the carcinogenic properties of œstrin, the position is even more confusing. It is certain that the injection of œstrin into male mice of a strain the females of which are peculiarly liable to spontaneous cancer, produces cancer in these male breasts. But here, as has been indicated, the injection of œstrin may merely change the "male" breast into a "female" one, which is, in any case, liable to cancer. Further, there appear to be strains so refractory to cancer that no amount of injected œstrin will produce cancer in either the male or female breast. It is when we come to the intermediate group of the relatively refractory strains that difficulties of interpretation arise. Attempts have been made to show that injection of œstrin in these relatively refractory strains increases the incidence of cancer of the breast, and if this property of œstrin can be proved, it is a very convincing step in establishing the carcinogenic power of œstrin, at least when very large doses are administered over long periods. Mice, however, show a refractoriness to cancer depending not only upon the strain to which they belong, but, according to Burrows (in a private communication), depending upon certain circumstances under which they are housed and allowed to mix freely together. As these factors in the production of refractoriness have only just been appreciated and have not yet been worked out, experiments on so-called relatively refractory strains are of but little value. We must first learn why they are refractory before we can interpret the effect of œstrin injection upon them. Even if these experiments eventually established the carcinogenic property of œstrin under these circumstances, it is still doubtful whether any advance will have been made as to our knowledge of the cause of breast cancer in man, because it does not seem likely that these relatively enormous quantities of œstrin ever circulate in man, although it might be true that in highly susceptible human stock a moderate excess of œstrin, acting over a long period, would favour the appearance of cancer of the breast.

The proof of the validity of these experiments is important, however, from our point of view because if œstrin does cause cancer of the breast in mice it appears to do it via the stage of cystic and epithelial changes in the ducts, which are similar to those met with in chronic mastitis in man. That is, œstrin appears first to cause cystic mastitis and then carcinoma, suggesting that cystic mastitis is a precancerous disease.

How are we to reconcile this with our clinical experience? The same arguments can be employed against the experimental pathologist who maintains that cystic mastitis is a precancerous lesion as were used against the histologist. We may say again, "However convincing your arguments appear to be that disease B follows disease A, you are approaching the problem indirectly, and there are a hundred possible fallacies for which you may have made inadequate allowance. For my part I find in practice that disease B follows disease A sufficiently infrequently for me to treat disease A as if there were no increased probability that disease B should follow."

TREATMENT

There are two ways in which the problem of treatment can be approached. We can attempt to redress the supposed endocrine imbalance, which may be responsible for the disease, or we can treat the condition symptomatically. If it could be shown in clinical practice that chronic mastitis were a precancerous lesion, then it would be our duty to treat the cause of the disease or to remove the organ involved. We should have to regard the symptoms as a helpful index of our progress—to be kept unmasked as assiduously as the pain and rigidity in a case of peritonitis that we are watching. But if, as we believe, chronic mastitis is not a sufficiently dangerous condition to warrant surgical interference, then we shall be justified in relieving the symptoms and in the words of Astley Cooper "returning the patient with delighted affection to her family."

In regard to the first method of treatment, various observers have tried the effect of endocrines. With a disregard for the implications of the work of the experimental pathologist which we may, or may not, regard as justifiable, the endocrine chiefly used has been œstrin—the very substance which, in its original form or in some abnormal form, is considered by many to be the cause of the disease. The rationale for the use of this substance is as follows: It is known that the symptoms of chronic mastitis worsen a few days before the onset of the menstrual period, at a time when the blood œstrin is low. It is known, too, that the disease practically disappears in the middle and later months of pregnancy when the blood œstrin is very high. Can it be that the lack of œstrin just before menstruation is responsible for the worsening, and the increased œstrin during pregnancy responsible for the improvement of the condition at these times? This line of reasoning unfortunately takes no account of the œstrin actually in the tissues, and this is more likely to be the important factor. To take an analogy in bone surgery: if our only method of investigation of a case of generalised osteitis fibrosa were the blood chemistry, we might look upon generalised osteitis fibrosa as a disease due to excess calcium, because an excess of calcium is found in the blood; whereas, we know, because calcium salts are opaque to X rays, that the disease is characterised by a lack of calcium in the bones, and the blood calcium is only high because the blood is working to capacity conveying calcium out of the bones and unloading it in the kidneys, whence it is excreted. It is quite possible that the same type of activity is occurring with regard to œstrin at the time of menstruation and during pregnancy. Unfortunately, œstrin is not, like calcium, opaque to X rays; nor are the methods of tissue œstrin estimation

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sufficiently advanced to be reliable. We must remember, however, that at times when the blood œstrin is high, the tissue œstrin may be low, and vice versa. The analogy with calcium can be pressed further in that it is thought that there are active and inactive forms of œstrin circulating in the blood, and œstrin estimation, like calcium estimation, takes cognisance only of the total material present and makes no distinction between what is active and what is inactive.

However ill-founded the rationale of this treatment may be, it is necessary, in view of the claims which have been made for it, to examine the effect of œstrin administration on patients suffering from chronic mastitis. Without being too sweeping it can be said that all the early attempts at treatment with ovarian residue are without significance as far as œstrin is concerned in that the amount of pure œstrin administered was too small to be effective.

A number of workers have given purified œstrin by mouth and by injection. I have had the opportunity of seeing the results of a large series of cases treated in this way in the United States, and was convinced that a high proportion of these cases was relieved of their symptoms. With the collaboration of my colleague, Dr. P. M. F. Bishop, and with the help of a grant from the British Empire Cancer Campaign, I have investigated the effect of œstrin injections in relatively high doses upon patients attending the mastitis clinic at Guy's Hospital. These experimental injections were carefully controlled with a parallel series receiving injections of sterile olive oil, and those which received oil were later given œstrin.

The technique of œstrin injection followed that commonly employed in the United States and was as follows: A dose of 10,000 international units of Dimenformon was injected intramuscularly twice a week for the first half of the intermenstrual period, and in some cases the same dose, or even higher doses, was administered throughout the intermenstrual period. These experiments are now continuing and when completed will be published in detail, but Dr. Bishop and I are satisfied in our own minds that the injection of sterile olive oil is as effective as the preparations of œstrin which we have used. We believe that œstrin injections may be harmful, an opinion which is strengthened by the fact that some of our patients, especially those receiving higher doses than 10,000 units, seem to be slightly worse as a result of their injection. The consequent increase in pain and nodularity is particularly marked some hours after each injection. It cannot, therefore, be too strongly emphasised that the psychological element in this disease is so important and the natural variations in nodularity so common that, in assessing the value of any therapeutic agent, it is essential that the most rigorous control should be exercised, otherwise any method of treatment may be hailed as a specific.

Similar claims with regard to testosterone (the male extract derived from the testis) have been made by Desmarrest and Capitain (1937). The rationale for this treatment is exactly the reverse of that for the use of œstrin. It is based on the supposition that in chronic mastitis œstrin is the villain of the piece and that testosterone is its natural antagonist. That this may be a mistaken supposition in regard to the breast is suggested by the work of Selye, McEuen, and Collip (1936), who show that testosterone injected into the experimental animal tends to produce a histological picture in the breast similar to that produced by injected œstrin. However, we are at present testing this substance on the same lines as those which we have used for œstrin, but our experiments in this direction have not advanced far enough for us to be able to express any opinion about them.

With regard to the use of endocrines in the treatment of chronic mastitis, let me refer to the views of William Rowley, expressed in 1793, "It is the duty of medical practitioners . . . to reason and judge candidly and make repeated trials of whatever may be concluded safe." Is the wholesale administration of these highly active and incompletely understood endocrines safe? Œstrin may be carcinogenic. In therapeutic doses, however, its carcinogenic properties appear to be almost insignificant and its effect, if any, would probably be similar to other extrinsic causes of cancer such as the aniline dyes and gastric irritants. It would probably determine the site, and might even antedate the appearance, of cancer in susceptible persons rather than generate cancer in a patient who would not otherwise suffer from it. In addition its effects on the menstrual cycle and its almost totally unknown psychological effect make it a dangerous weapon in the hands of the unwary. Such objections apply with even more force to testosterone, with its well-known powers of masculinisation. All our patients receiving this substance are subjected to frequent and regular examinations for the detection of the earliest evidence of this undesirable effect. Endocrine therapy has come to stay. Its value in reproductive and menopausal disorder is, I am told, being increasingly demonstrated. But before resorting to it we must be quite sure that it is doing what we intend it to do, and, perhaps more important, that it is not doing what we do not intend it to do. At present there is no justification other than the experimental for administering endocrine preparations to patients with chronic mastitis.

If we relieve the symptoms we have done all that is required for the welfare of these patients. Fortunately, in a very large proportion of cases this can be done. First, it is necessary to make quite sure of the diagnosis. If there is the slightest doubt as to the malignancy of a lump in the breast, then that breast should be operated upon by one of the recognised procedures adopted in cases of doubtful lumps in the breast. If, after a careful examination, there is no doubt but that the case is one of chronic mastitis, the patient should be reassured. She should be told in so many words that she is not suffering from cancer and that her condition does not predispose to cancer; that she has no more liability to cancer than any other woman of her acquaintance. She should be supplied with a well-fitting breast support and a "placebo" may be prescribed. If the pain varies with the weather, diathermy may be found helpful. If it comes on just before the menstrual period, she should be advised to rest and to avoid using the arms as far as is practicable at this time.

Most patients suffering from chronic mastitis will benefit enormously from such treatment, but there remains a percentage in whom the pain persists and renders life intolerable. I have not had any personal experience of X ray therapy with this disease, but patients attending the mastitis clinic who have had a course of treatment with X ray therapy and whose symptoms have been made worse, have persisted or, after a temporary easement, have returned, make me suspicious of its effect.

Finally, for the patient who despite palliative measures still complains of bad pain in the breast,

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I have given submammary injections of proctocaine. This treatment is simple to carry out, is safe, and from the ease with which the proctocaine is projected from the needle the impression is gathered that the oil spreads out in the submammary plane. The effect is to abolish temporarily all sensation from the breast, and the pain is completely relieved, but for some reason this effect is not so prolonged as when the same substance is employed in the region of the anus, and the pain returns in about a week. Recently I have been giving alcohol injections into the 3rd, 4th, and 5th intercostal nerves in the axillary line. The results of such forms of local treatment encourage me to think that some method may be found suitable for abolishing the pain in obstinate cases of mastitis, especially when this pain comes on at intervals and lasts for a short time only.

SUMMARY

1. Chronic mastitis is defined as any painful or nodular lesion of the breast not due to bacterial inflammation, new growth, or fat necrosis.

2. There are three factors producing the pain—an endocrine factor, a neuralgic factor, and a psychological factor.

3. The cause of nodularity is probably endocrine.

4. The views of the histologist and the experimental pathologist are discussed.

5. Although highly suggestive evidence of the precancerous nature of mastitis has been advanced by the histologist and the experimental pathologist, the chance of cancer following chronic mastitis is so small that it may be disregarded in the treatment of this condition.

6. In spite of the most extravagant claims to the contrary, the use of endocrine preparations in the treatment of chronic mastitis is permissible only on experimental grounds. Even if the main effect of these products is what we desire, the subsidiary effects are so ill understood and in many cases so undesirable, that many years of careful work may be necessary before it is safe to advise their therapeutic application in general practice.

I should like to thank Dr. R. T. Grant, director of the clinical research unit at Guy's Hospital, and also my father for their helpful criticisms of this paper. The photomicrographs are the work of Mr. G. Walker, of the anatomical department of Guy's Hospital, whose interest and assistance are unfailing. The clinical investigations were made possible by the coöperation of the members of the staff of Guy's Hospital, who have supplied me with a steady stream of material, and by the aid of a grant from the British Empire Cancer Campaign.

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INTRATHECAL SULPHANILAMIDE IN MENINGOCOCCAL MENINGITIS

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Only a few papers have been published that deal with the passage of sulphanilamide into the cerebro-spinal fluid (C.S.F.), its time of appearance, concentration, and influence upon meningococcal infection.

Buttle, Gray, and Stephenson (1936) and Proom (1937), in their series of experiments on mice, show that the administration of sulphanilamide by mouth or intramuscularly prevents death after otherwise lethal doses of meningococci.

The protection however is limited. If the number of meningococci injected exceeds a certain limit, the mice will die in spite of the sulphanilamide even if it is given in the most favourable doses. And, furthermore, the experiments show that treatment has to be instituted soon after infection. A delay even of a few hours will diminish the protective influence considerably.

Marshall, Emerson, and Cutting (1937), in their work on the elimination of the sulphanilamide into the C.S.F. of both dogs and humans, have demonstrated sulphanilamide in the C.S.F. four hours after giving it by mouth, in concentrations that varied from a third to three-quarters that in the blood (the concentration in the blood was 4·0–6·5 mg. per 100 c.cm.). In other words they have shown that elimination takes place rapidly and in a comparatively high concentration. But it must be noted that these experiments were made on healthy animals and humans. If the meninges are infected, the elimination presents a different picture. Jauerneck and Gueffroy (1937) have found that in patients with meningitis one or two days may elapse before the sulphanilamide can be demonstrated and that the concentration in many cases is very small (0·01 mg. per 100 c.cm.). They mention that they have treated 7 cases of purulent meningitis with sulphonamide preparations, by mouth and intramuscularly. Of these 5 died, the 2 survivors being only mild cases. The remedy then does not appear to be particularly effective when administered in this fashion.

The Americans, Schwentker, Gelman, and Long (1937), have published 12 cases of meningococcal meningitis treated with intrathecal and intramuscular injections of sulphanilamide solution. There were 5 children aged 2–10 and 5 adults aged 21–34, and the disease varied from moderate to very severe. Only one died—a man 27 years old, who developed pneumonia.

PREPARATION AND METHOD

In the Blegdamshospital we have used the treatment with sulphanilamide in 12 consecutive cases of meningococcal meningitis. We worked with a preparation called Streptamide (Løvens, Copenhagen), supplies of which were given us so that we might test its value.

Streptamide, like all other preparations of sulphanilamide, is difficult to dissolve, reaching saturation at 0·9 per cent. We have used a 0·8 per cent. solution made from small bottles containing 20 g. each, previously sealed and sterilised in an autoclave. Our procedure in making the solution has been as follows: A suitable amount of streptamide—0·8 or 1·6 g.—is weighed, with aseptic precautions. A sterilised Erlenmeier flask containing 100 or 200 c.cm. of 0·9 per cent. saline is heated until the

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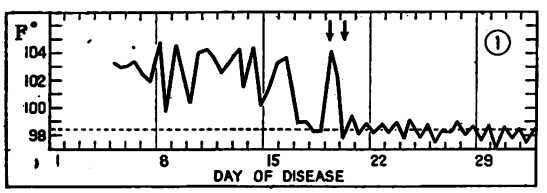
solution begins to boil, the heat is then turned off and the streptamide is put into the flask which is agitated until the crystals are dissolved. The flask is then cooled off until the temperature is about 100° F., at which temperature the injection is made.

Into the spinal canal we have always injected a little less fluid than the amount withdrawn, never more than 30 c.cm. Intramuscularly we have injected as much as 70–150 c.cm. streptamide solution according to the weight of the patient. In addition to the injections with streptamide we have treated the patients with withdrawals of C.S.F. For the first 10–20 days this has been done daily, later every second or third day.

CLINICAL RESULTS

(See Chart to each case)

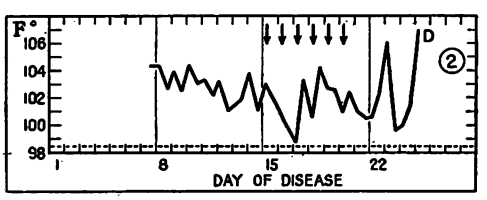
CASE 1.—A boy, aged 2, was admitted on May 23rd on the 5th day of his illness. His fever was high, general condition very bad. There was ptosis of the left eyelid, strabismus, much rigidity of neck and back. C.S.F.: 1331/3 cells * and many intra- and extra-cellular meningococci. On the day after admission (6th day) treatment with meningococcus vaccine was instituted but without



The arrows indicate dose of sulphanilamide.

any change in his condition. On the 15th day (9 days later) we began the streptamide treatment. On 3 different days (June 3rd, 5th, 7th) he was given respectively 20, 30, and 15 c.cm. intrathecally and about 100 c.cm. daily intramuscularly. He improved very quickly. From June 8th his temperature was normal, and he was discharged on July 12th perfectly well.

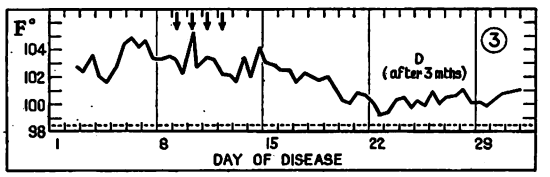
CASE 2.—A boy, aged 6 months, was admitted on July 7th having been ill for 6 days with high temperature (up to 104° F.) and neck rigidity. He had also a bilateral suppurative otitis media for which we did a paracentesis. General condition fairly good. C.S.F.: 1000/3 cells, but no demonstrable meningococci until July 14th. On the



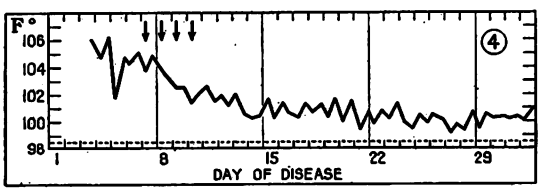
D = Death.

day after this (the 15th day of his illness) treatment with streptamide was begun. He was given six intrathecal injections over 6 days, 20 c.cm. daily and also 80–100 c.cm. daily intramuscularly. There was some improvement during the first two days after the beginning of the treatment, but later on he became worse and on July 25th pneumonia was diagnosed. The boy died.

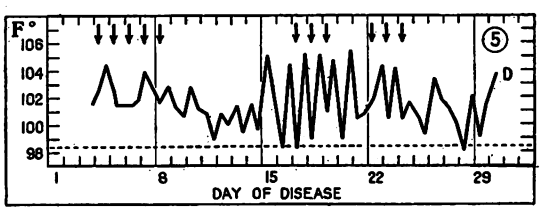
CASE 3.—A girl, aged 4 months, was admitted on July 9th on the 2nd day of her illness with fever of 102°–104° F. and gastro-intestinal symptoms: vomiting and thin foul-smelling stools. On the 7th day meningeal symptoms became evident. C.S.F.: 10,000/3 cells and many meningococci. On the 10th day she was given 8 c.cm. streptamide intrathecally and the next day 10 c.cm. For these and the next 2 days she received daily 80 c.cm. intramuscularly. Six days later her temperature was normal. She was discharged with a hydrocephalus but was soon readmitted, because the mother could not give her proper care. The hydrocephalus increased and finally caused her death on Oct. 5th.



CASE 4.—A girl, 4 years old, was admitted on July 13th after 2 days' illness with a temperature of 106° F. There was angina with plaques, abdominal pain, and vomiting, but no meningeal manifestations. C.S.F. contained no cells and no bacilli. On July 15th rigidity of back and neck set in and Kernig's symptom was positive. There were about 7000/3 cells in the C.S.F. and many meningococci. Next day (5th day of illness) we began treatment with streptamide and for 4 consecutive days she had 20, 20, 30, and 10 c.cm. intrathecally and about 150 c.cm. daily intramuscularly. Her general condition improved very rapidly and the temperature fell. On July 25th she began to have symptoms of polyarthritis. There was swelling, redness, pain, and limitation of motion in several joints, but after about a month (August 20th) these symptoms had disappeared and the temperature was normal and remained so. She was discharged on Sept. 9th healthy in every respect.



CASE 5.—A boy, aged 1½, was taken ill on July 26th and admitted on the 3rd day with symptoms pointing to meningitis. C.S.F.: 15,000/3 cells and many meningococci. On the day after (4th day) and for 5 consecutive days streptamide was administered, 10–20 c.cm. intrathecally and 100–150 c.cm. intramuscularly. General condition improved and the temperature fell, but on August 9th it rose again to 104·7° F. While injections were being given there were no demonstrable meningococci in the C.S.F., but on this day they reappeared. On August 11th, 12th, and 13th, and also on 16th, 17th, and 18th, he was again given streptamide injections. He continued sick and miserable. On the 24th he became weak, listless, and tired, and died.



CASE 6.—A 1-year-old girl became ill on August 21st with a temperature of about 104° F. On admission next day her condition was very poor. We found signs of rickets—the rosary, Harrison's sulcus, and hypertrophy of the epiphyses. There was rigidity of back and neck, numerous petechiæ and ecchymoses on buttocks and thighs about the size of a shilling. C.S.F.: about 20,000/3 cells and abundant meningococci. Diagnosis: meningococcal septicæmia and meningitis. Streptamide injections were instituted on the 3rd day. Three days in succession she received 10 c.cm., and then for 2 days 5 c.cm., intrathecally; during both periods she daily had

* 1331 cells in 3 c.mm. of C.S.F.

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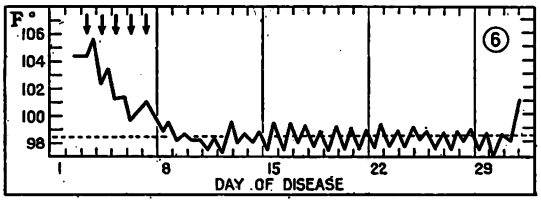
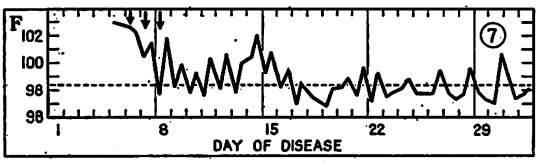
100 c.cm. intramuscularly. During this period of daily injections the temperature fell and became normal on August 29th (9th day) and from then on remained so. The improvement in her general condition was quite dramatic. One evening she was apparently dying and had a temperature of 105·8° F. The next evening she was sitting up in bed—eating. She was discharged as cured on Sept. 30th.

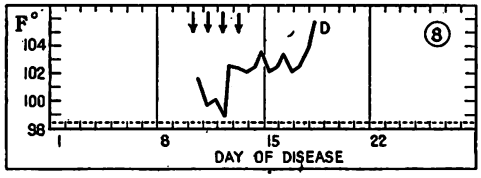


CASE 7.—A boy, aged 7 months, became ill on Sept. 6th with fever, vomiting, and thin, watery stools. On the 5th day he was admitted to a pediatric hospital, having convulsions that lasted five minutes. C.S.F.: 2700/3 cells and numerous meningococci. Next day he was transferred to this hospital and was on admission a very sick child. He cried at the slightest touch, had pronounced rigidity of back and neck, and all over his back and his limbs petechiæ were found and ecchymoses almost the size of a lentil. Treatment with streptamide was begun on Sept. 12th, the 7th day of his illness. For 3 days he



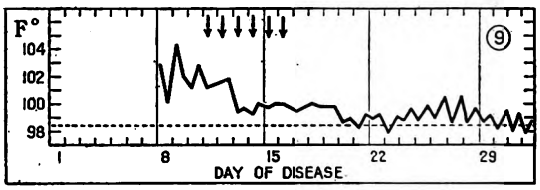
received 10 c.cm. intrathecally and 100 c.cm. intramuscularly, whereafter the streptamide was given by mouth, 2 tablets daily of 0·30 g. each. His general condition began to improve after a few days and the temperature was normal from Sept. 23rd (17th day). The first three weeks he had lumbar puncture every day, during the next 14 days every third day. He was discharged on Nov. 21st perfectly normal in mind and body.

CASE 8.—A boy, aged 7 months, developed on Oct. 22nd a temperature of 104° F. Nine days later he had convulsions and for that reason he was admitted to a children's hospital. Here he did very badly; his hæmoglobin was only 45 per cent. and the C.S.F. contained 9000/3 cells and an abundance of meningococci. Consequently he was



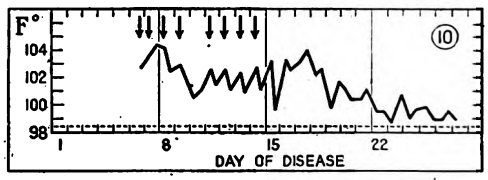
at once transferred to this institution, where streptamide treatment was begun immediately on his arrival (10th day of illness). For 4 days he had 20, 12, 20, and 20 c.cm. intrathecally and 100 c.cm. daily intramuscularly. His general condition improved and the temperature fell during the first 2 days, while he was receiving injections. Then the temperature began to rise again and he became more ill and listless, the amount of cells in the spinal fluid became greater, even as high as 45,000/3 cells on Nov. 5th. He died on Nov. 8th.

CASE 9.—A boy, aged 4 months, became ill on Dec. 3rd with a temperature of 104·2° F. On Dec. 7th he was sent to a children's hospital. On Dec. 9th 4800/3 cells and meningococci were found in the C.S.F. He was given prontosil 2·5 c.cm. intramuscularly and the next day 5 c.cm. On Dec. 10th, the 8th day of his illness, he was transferred to this institution. C.S.F.: 25,000/3 cells and meningococci. On the next and on the following 5 days he had 15, 8, 15, 18, 10, and 20 c.cm. streptamide intrathecally and 35–50 c.cm. intramuscularly every day. On Dec. 19th (17th day) the temperature became normal, the number of cells decreased rapidly, and 5 days later only 700/3 were found. On the 22nd an abscess was

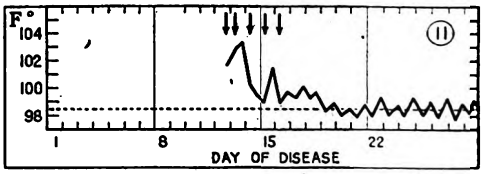


discovered on the right side of the thorax. This was opened the next day. At the same time the stools became thin, greenish, and full of mucus, and the temperature rose a little. This lasted until Dec. 29th, when his stomach again acted properly and his temperature became normal. The patient is still with us because meningococci are still demonstrable in the throat.

CASE 10.—A 3-month-old girl became ill on Jan. 8th; temperature 102° F.; uneasiness; loss of appetite; thin, slimy, foul-smelling excrements. On Jan. 10th an ecchymosis the size of a lentil was found at the right elbow and a few petechiæ elsewhere on the body. On the 11th she was admitted to a children's hospital with the diagnosis enteritis and hæmorrhagic diathesis. On the 6th day of her illness lumbar puncture showed meningococci. The same day she was transferred to the Blegdamshospital. Her condition when admitted here was extremely poor, ecchymoses were found on the left arm, petechiæ



on the left calf, on the buttocks, and on the face. The C.S.F. was for the first few days purulent and so heavy that it could not of itself escape through a fairly wide lumbar cannula, but had to be drawn out. We at once began treatment with streptamide, giving one injection daily for 8 days; the amount of liquid injected intrathecally varied between 10 and 15 c.cm., intramuscularly between 40 and 80 c.cm. On Jan. 18th the general condition was improved and the spinal fluid was now thin. On Jan. 21st the spinal fluid was only slightly opaque; cell count 1150/3. From Jan. 29th (22nd day) on the temperature has been in the vicinity of normal. She was discharged as cured on Feb. 27th.



CASE 11.—A boy, aged 8 months, on Jan. 6th began to take sick, having a little fever and cough. On Jan. 14th the temperature was 103° F., so he was admitted to the children's hospital, the case diagnosed as bronchitis. He vomited frequently and cried at the slightest touch. On Jan. 17th he showed rigidity of the neck, and meningococci were found in the C.S.F. The same day (12th of the disease) he was transferred to the Blegdamshospital. C.S.F.: 5800/3 cells and numerous meningococci. We began at once treating him with streptamide; 15–20 c.cm. was given for 5 days intrathecally and 100 c.cm. a day intramuscularly. His general condition improved rapidly.

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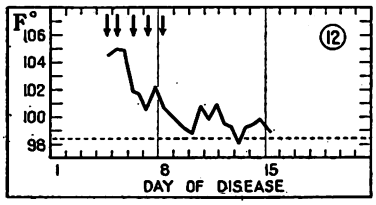
Since Jan. 21st the temperature has been normal. He was discharged cured on March 3rd.

CASE 12.—A 1-year-old girl, after a period of colds, suddenly on Jan. 20th became feverish (103·4° F.), and was admitted to a children's hospital. Diagnosis: catarrh, ? otitis media. Some swelling was found over the left mastoid, so she was transferred to an otological department. Nothing abnormal was found in her ears, however, nor any typical meningeal symptoms, but the anterior fontanelle was somewhat tense. Lumbar puncture showed 8000/3 cells and numerous meningococci. She was transferred to the Blegdams hospital on the 4th day when we found 17,000/3 cells in the spinal fluid and numerous meningococci. We gave streptamide injections for 5 days, 10 c.cm. intrathecally and 40 c.cm. intramuscularly each day. The temperature fell during the period of injections and has been about normal since the 9th day. She was discharged as cured on March 4th.



COMMENTS

Of our patients, 7 were boys and 5 were girls. Their ages were 3, 4, 4, 6, 7, 7, 8 months, 1, 1, 1½, 2, and 4 years. They were all severe cases. Out of these 12 patients 3 died, their deaths resulting directly or indirectly from their meningitis (Cases 2, 5, and 8). Case 2 had on admission besides meningitis bilateral, acute, suppurative otitis media, and developed pneumonia shortly before he died. Case 5 presented an unusual picture. After the first series of streptamide injections his general condition improved, temperature fell, and the meningococci could not be demonstrated in the C.S.F. On the fourteenth day of the illness the general condition became less satisfactory, the temperature rose, and the meningococci again appeared. Repeated treatment with streptamide proved without effect. Case 8 was, before he developed meningitis, in a very poor condition generally, his hæmoglobin being only 45 per cent. Case 3 died from hydrocephalus three months after the acute meningitis had subsided.

Two patients (Cases 6 and 7) among those that got well are outstanding, because both had meningococcal septicæmia which has a prognosis that is notoriously bad. Both of those children, one aged a year, the other 7 months, were at the time of their admission so run-down that we regarded the outlook as hopeless. Nevertheless they got well and they got well quickly.

Here in this hospital the mortality for meningococcal meningitis in children under 4 has in the last six years (in 68 cases) varied from 50 to 100 per cent., and has on an average been 70 per cent. Of those of our patients, that were treated with streptamide, only 25 per cent. died. The number treated is not very large, but the figures seem to indicate that the mode of treatment used is able to reduce the mortality considerably.

In the cases that are published by the Americans conditions are more favourable from the beginning, because the mortality of meningitis is very much less in older children and in adults—even without sulphanilamide—than in babies.

The conclusion so far reached about the sulphanilamide treatment of meningococcal meningitis here and elsewhere is that it has but little effect if the remedy is administered exclusively by mouth or intramuscularly. But if it is given intrathecally along with the other administrations, then the treatment is very valuable. This is probably because the elimination of the sulphanilamide through the meninges may be both very slow and very slight when they are inflamed. It is not likely that intrathecal injections alone are sufficient, because meningococci can be found outside the spinal canal, and on these the sulphanilamide, when given by mouth or intramuscularly, can have considerable effect.

SUMMARY

Twelve cases of meningococcal meningitis in children under 4 have been treated with intrathecal and intramuscular injections of 0·8 per cent. sulphanilamide solution. The amount injected into the spinal canal is from 5 to 30 c.cm., according to the amount of spinal fluid withdrawn. The amount injected has been less than the amount withdrawn. The intramuscular doses have been from 35 to 150, according to the weight of the patients. In the series 3 have died (25 per cent.). The average fatality-rate in this hospital for the last six years has been 70 per cent. for children under 4.

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PSEUDO-HÆMOPHILIA IN A WOMAN

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THE possibility of hæmophilia occurring in the female is a problem that has resulted in much speculation but no definite solution. Many reported cases have been claimed as examples of this condition, but in none is the evidence conclusive, and in most the diagnosis is completely unwarranted. Hæmophilia is a well-defined condition, and certain clinical and laboratory findings, quite apart from questions of sex or genetics, constitute the criteria upon which its diagnosis should depend. In the present state of our knowledge these may be summarised as follows:

(1) The tendency, from early infancy, to excessive bleeding following trivial injury.
(2) After the first few years of life, hæmorrhage into the joints.
(3) A definite delay in the coagulation of the blood, but no quantitative alteration in the platelet, prothrombin, fibrinogen, or calcium content.
(4) The absence of any cause for the hæmorrhagic tendency other than the defective blood coagulation.

Unless these conditions can be fulfilled a diagnosis of hæmophilia cannot be made with confidence, though occasionally a mild case may escape hæmarthrosis. The case that follows is reported because of its remarkably close adherence to these conditions.

CASE REPORT

The patient is a woman, now aged 60, employed in a potato-chip factory.

History.—She was quite well until June, 1933, when the extraction of a tooth resulted in hæmorrhage that persisted for a week. A month later the left elbow became swollen and stiff, and when the

* Assisted by a grant from the Medical Research Council.

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swelling subsided a week afterwards there was some limitation of movement. In January, 1934, she bled from the rectum for 3 days, and a year later had an attack of hæmaturia lasting about 3 weeks, during which she was admitted to the Central Middlesex County Hospital. A complete investigation of the urinary tract failed to reveal a cause for the bleeding. In May, 1936, she reappeared at the hospital with a swelling of the tongue, which had begun without obvious cause a few hours previously. On examination the tongue, which was greatly enlarged, was found to be dark in colour, apparently infiltrated with blood, and exuding a blood-stained fluid. There was slight swelling in the submental region. No local cause could be found for the hæmorrhage, and no other physical abnormality was detected, apart from the limited movements at the left elbow. The blood count was normal, and the platelets numbered 194,000 per c.mm.; blood pressure 140/80 mm. Hg. The next day the tongue was almost black, and a bluish discoloration had appeared on the neck, later spreading down to both clavicles and over the sternum. The tongue returned to its normal size in about 10 days, the discoloration disappearing more gradually.

In the ensuing 12 months the patient was readmitted to hospital on four occasions with severe hæmorrhages into various parts of the body. One involved the left forearm from elbow to wrist, another the whole of the right arm from shoulder to hand. There were others into the conjunctivæ, and the subcutaneous tissues of the face, neck, thighs, and buttocks. The right elbow also became swollen, and later permanently limited in its movements. During these visits no abnormality was found on examination that was not directly the result of hæmorrhage, apart, possibly, from the joint changes. Both elbows showed extension limited to about 135°.

Investigations.—The following investigations were carried out: Radiograms: chest and heart normal; elbow-joints, some arthritis. Wassermann reaction negative. Urine: a few red cells and a trace of protein on one occasion, otherwise normal. Ascorbic acid: 104·6 mg. excreted in 24 hours.

Blood.—Calcium, 11 mg. per 100 c.cm. Fibrinogen, 320 mg. per 100 c.cm. Blood count:

Red cells	4,300,000 (per c.mm.)	White cells	9000 (per c.mm.)
Hæmoglobin	82 %	Polymorphs	61 % (5490)
Colour-index	0·95	Lymphocytes	35 % (3150)
		Monocytes	3 % (270)
		Eosinophils	1 % (90)

Some polychromasia. Mean corpuscular volume 88 cu.μ. Reticulocyte count, 3·4 %. Red-cell fragility normal. Platelet counts, 200,000–280,000 per c.mm. (highest and lowest of four counts).

Tourniquet test: slight positive on one occasion, negative on others. Bleeding time never more than 4 min. (Duke's method). Coagulation time: (1) 3 min. 5 sec.–6 min. (upper and lower limits of four estimations by Dale and Laidlaw's method; normal upper limit 2 min.). (2) 43–67 min. (upper and lower limits of five estimations by Lee and White's method; normal upper limit 12 min.). Clot retraction: 46 per cent. as measured by a method to be published shortly by one of us (R. G. M.); this value, rather lower than normal, lies within the figures obtained in hæmophilia; the clot after retracting was strikingly like a hæmophilic clot, being shaggy and irregular, in contrast to the smooth, rounded surface normally seen.

INVESTIGATION OF DEFECT IN COAGULATION

The only detectable abnormality, apart from the positive tourniquet test on one occasion, was the defect in the coagulation of the blood. Two experiments were made to investigate this defect further.

Russell's viper venom behaves like thrombokinase, that is, it apparently activates prothrombin in the presence of calcium.

One part of a 1 in 10,000 solution of the venom was added to 9 parts of the patient's blood, and also to normal and to hæmophilic blood in the same proportion. This experiment was carried out in Wassermann tubes at 37° C. and coagulation was timed to the moment at which the tubes could be inverted without spilling the contents.

TABLE I—EFFECT OF RUSSELL'S VIPER VENOM

	Coagulation times.	
	Plus saline.	Plus venom solution.
Patient's blood	48 min.	31 sec.
Normal blood	9 „	17 „
Hæmophilic blood	45 „	23 „

From Table I it will be seen that rapid coagulation occurs on the addition of venom, and that there is little difference between the patient's blood and hæmophilic blood in their reactions. In both a firm clot was formed. Hence fibrinogen, calcium, and prothrombin are present in the patient's blood, and functionally active on the addition of kinase.

Coagulating factor.—Recent work by Patek and Taylor (1937) in the United States and by Bendien and Creveld (1936) in Holland shows that normal plasma contains a factor capable of accelerating the coagulation of hæmophilic blood. This factor, which may be identical with prothrombin, is still active in plasma that has passed through a Berkefeld or similar filter, in spite of the fact that such plasma itself clots slowly on recalcification. Hæmophilic plasma is inactive in this respect. It was clearly of interest to see how the patient's blood behaved with regard to this factor.

For this experiment blood was obtained from the patient, a hæmophilic subject, and a normal donor, and each sample was citrated with 0·1 volume of 3·8 per cent. sodium citrate solution. The plasma was obtained by centrifuging, and then filtered through a Seitz filter, a new pad being used for each sample of plasma. Blood was obtained from a second hæmophilic donor, and equal volumes were measured into Wassermann tubes. The filtered plasma was added to this whole blood, in the proportions of 1 volume of plasma to 9 volumes of blood. The temperature was kept at 37° C., and coagulation timed as before. The results given in Table II show that the patient's plasma, unlike normal plasma, fails to accelerate the clotting of hæmophilic blood.

TABLE II—EFFECT OF FILTERED PLASMA ON HÆMOPHILIC BLOOD

Hæmophilic blood plus—	Coagulation time.
Saline	31 min.
Normal plasma	6 min. 50 sec.
Hæmophilic plasma	30 min.
Patient's plasma	28 min. 30 sec.

The next experiment had to be carried out with the patient's citrated plasma (unfiltered), since no whole blood was available. It was recalcified with 0·2 volume of 1·18 per cent. calcium chloride solution, and filtered normal and hæmophilic plasma added immediately afterwards, in the same proportions as before. The results are given in Table III.

TABLE III—THE EFFECT OF FILTERED PLASMA ON THE UNFILTERED PLASMA

Patient's plasma plus—	Coagulation time.
Saline	32 min.
Normal plasma	6 min. 40 sec.
Hæmophilic plasma	24 min. 5 sec.

Again there is a similarity to hæmophilic blood, since the coagulation of the patient's plasma is accelerated by normal filtered plasma, and but little affected by hæmophilic plasma. All these experiments suggest, therefore, a similarity between the

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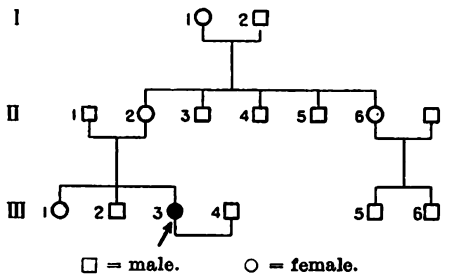
patient's blood and hæmophilic blood, since in both there is inactivity of a factor which is active in normal filtered plasma.

PREVIOUS FAMILY HISTORY

There was nothing to be discovered in the patient's previous history to account for the onset of the hæmorrhagic diathesis. She had always been well, with no suggestion of a dietary deficiency. Menstruation was regular and never excessive. She had a miscarriage at the age of 28 but no other pregnancies. The menopause occurred at the age of 53. Several teeth were extracted soon afterwards, without excessive bleeding.

All her relatives have died or been lost sight of, so that no direct investigations are possible. So far as can be obtained from her, her pedigree and the family history are as follows:—



I/1 no information; I/2 died aged 65, no previous ill health.

II/1 died aged 74, no previous ill health; II/2 died aged 76, farm worker, always healthy; II/3, 4, and 5 all died of old age after healthy lives; II/6 died of old age.

III/1 died in infancy, cause doubtful; III/2 killed in Boer War, previously healthy; III/3 the patient; III/4 died of cancer in 1915; III/5 and 6 believed to be alive, healthy when last heard of.

COMMENTS

The main features of this case, therefore, are as follows:—

(1) The sudden onset, in a woman of 56, of a tendency to bleed, resulting in hæmorrhage from a tooth socket, hæmaturia, rectal hæmorrhage, and many extensive hæmorrhages into the tissues and, possibly, into the joints.

(2) No organic cause for this tendency was found, other than a prolonged coagulation time and, on one occasion, a faintly positive tourniquet test. The platelets, bleeding time, blood calcium, and blood fibrinogen were normal.

(3) The patient's blood and hæmophilic blood behave similarly in their reactions to kinase and filtered plasma.

(4) There is no history of similar condition occurring in any other member of her family.

There is, therefore, a remarkable resemblance between the findings in this case and in hæmophilia, but there are points of divergence. First, the condition is acquired. No genuine instance of hæmophilia acquired in late adult life has, so far as we know, been recorded. Secondly, the fact of hæmorrhage into the joints has not been established, though the history and subsequent limitation of movement is suggestive. The points against it are that the elbow is seldom the first joint to be involved in hæmophilia, and that limitation of movement usually occurs only after several hæmorrhages. Thirdly, the tourniquet test produced a small crop of minute petechiæ on one occasion, evidence of capillary involvement which does not occur in hæmophilia. It is because of these points of divergence that we have labelled the case pseudo-hæmophilia, but it resembles hæmophilia more closely than any other hæmorrhagic condition.

In the cases previously recorded, the resemblance to hæmophilia is usually superficial or non-existent.

Bullock and Fildes (1911), in their monumental survey of all hæmophilia records up to 1911, found no conclusive evidence that the condition occurred in females. They examined the records of over 600 hæmophilic families.

Carrol Birch (1937), from personal observation of 78 hæmophilic families in the United States, finds that none of them includes affected females, and in this country, one of us (R. G. M.) has had a similar experience with 41 families. Handley and Nussbrecher (1935) record the nearest approximation to inherited hæmophilia in the female. They describe two sisters with hæmorrhagic symptoms and slightly delayed blood coagulation. The bleeding times and platelet counts were normal. The women belong to a large family of bleeders originally examined by Bulloch and Fildes, who dismissed the diagnosis of hæmophilia, the hæmorrhagic tendency being transmitted directly from father to son for three generations. The affected females were the offspring of a first-cousin inter-marriage.

Bucura (1920) collected 197 cases of female "hæmophilics" from the literature, but found that to none of them did the diagnosis truly apply.

Mildred Warde (1923) records a case, under the title of "female hæmophilia." The patient had bled badly from a tooth socket and a cut thumb, but the fact that removal of a breast caused no undue hæmorrhage must throw some doubt on the severity of the hæmorrhagic tendency. The coagulation time was 3 min. 5 sec., but this is unenlightening as the method used is not specified. No other investigations were made.

Foulis and Crawford (1934) give a brief account of two "female bleeders" said to come of hæmophilic stock, though the inheritance shown in their chart is atypical. Again the evidence is inconclusive, and no investigations were made.

On the Continent Bauer and Meller (1937), Bauer and Wehefritz (1924), Cassoute and Raybaud (1924), Gasbarrini (1933), and Steinbrink (1925) report cases remarkable for their similarity to each other. In these, women and girls show a definite tendency to bleed, and investigations reveal prolonged clotting and bleeding times and thrombocytopenia. In view of these last two observations a diagnosis of hæmophilia cannot be justified, but the constancy of the findings suggests that these cases may be examples of a definite hæmorrhagic syndrome.

Finally Schultz (1930) reports the case of a girl, said to come of hæmophilic stock. She had, among other hæmorrhages, hæmaturia and bleeding into the joints, the latter being a condition that apparently did not occur in the other cases. On reaching the age of puberty her symptoms disappeared. It is unfortunate that no investigations were made, as the clinical picture closely resembles that of hæmophilia. In view of the storm that has lately raged about the question of ovarian function in relation to hæmophilia, it might be unwise to suggest an analogy between the disappearance of symptoms at puberty in Schultz's case and their appearance after the menopause in ours.

CONCLUSION

The case described probably bears little relation to the familiar hereditary hæmophilia in the male, for the reasons discussed. It can, therefore, shed little light on the question of female hæmophilia from the genetic point of view. It does, however, represent a hæmorrhagic diathesis with a pathology almost undistinguishable from that of hæmophilia, whatever ætiological differences there may be in the two conditions.

(*References at foot of next page*)

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SEROLOGIC STUDIES IN EPIDEMIC INFLUENZA

WITH PARTICULAR REFERENCE TO THE PERSISTENCE OF ANTIBODIES AFTER INFECTION

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ALTHOUGH recovery from a virus disease is usually accompanied by a high degree of resistance to subsequent infection, immunity to influenza is of relatively short duration; several attacks in the same individual are not uncommon. In view of the high antibody content usually found in those who have recently recovered from infection, this low-grade immunity is surprising. The reason for this paradoxical position has not been determined, but probable factors are: first, the existence of several immunologically distinct strains of virus and, secondly, the rapid disappearance of the antibodies produced by infection. As a number of recently infected persons were available an opportunity was presented of studying over a period of 10–12 months fluctuations in the antibody content of their serum—i.e., the rôle played by the second of the above factors.

Available evidence strongly indicates that there is a relationship between the presence of specific antibodies in the serum and resistance to infection with the influenza virus. Several workers have reported that, after recovery from epidemic influenza, there is generally an appreciable increase in the titre of both the neutralising and complement-fixing antibodies (Francis and others 1937, Hoyle and Fairbrother 1937). Hoyle and Fairbrother also found that, in a selected community, during the 1936–37 epidemic only those with a low antibody titre became infected, while two persons with relatively high titres and coming in close and continued contact with cases of influenza remained apparently unaffected. Only a small number (44) was observed and it must also be stated that several with low titres did not become infected. Smorodintseff and his co-workers (1937) reported that individuals with little or no antibodies were readily infected when sprayed with the virus, while those with relatively high titres were resistant. The antibody titre thus appears to be a simple index of resistance to infection—absence of antibodies or a relatively low titre indicates susceptibility and a high titre resistance. The critical level that demarcates these two states can not however be defined with any accuracy. Hoyle and Fairbrother (1937) suggested that resistance was indicated by a titre of the fixing antibody in the region of 1 in 8, according to their method of carrying out the test.

It has also been found that ferrets recently recovered from infection with the virus are resistant to reinfection and that their serum has a relatively high antibody content. After a varying period of 5–12 months the immunity wanes; antibody concentration is decreased and the intranasal instillation of the virus gives rise to an infection that is milder than in normal animals. This waning immunity can be reinforced by active immunisation. It has been suggested that most subjects resemble the recovered ferrets in that they have some basic immunity (Smith, Andrewes, and Laidlaw 1935). This, however, is not enough to resist infection in all cases.

TECHNIQUE

Neutralisation test.—This was carried out in the usual manner. Serum suitably diluted with saline was mixed with an equal volume of the virus suspension containing approximately 10,000 minimum infecting doses, after standing at room temperature for 15–30 minutes, the mixture was given intranasally to mice under ether anæsthesia. The animals were killed at the end of 4 or 5 days and the lungs closely examined for lesions.

Complement-fixation test was performed in the manner previously described (Fairbrother and Hoyle 1937). The antigen was a saline suspension of dried mouse lung lesions and 2½ M.H.D. (minimum hæmolytic doses) of complement were used. The titre is taken as the initial dilution of the serum added to the complement-fixing system. Francis and his colleagues (1937) have adopted the final dilution to express the titre; this would, of course be a three-fold greater dilution than that in our test. We have, however, continued to employ the conventional method of expressing the titre of serum in this reaction, and the necessary allowance must therefore be made in comparing the two sets of results.

TABLE I—COMPLEMENT-FIXATION TESTS OF SERA BEFORE AND AFTER 1936–37 EPIDEMIC

Titre.	Groups— A	B	C
	Post-epidemic (October, 1937).	Pre-epidemic (1936).	Con-valescent.
1:128	0	0	9
1:64	0	0	13
1:32	7	0	14
1:16	12	2	10
1:8	72	15	11
1:4	79	60	8
1:2	65	63	0
Doubtful 1:2 ..	54	64	0
Negative ..	92	96	0
Total ..	381	300	65

RESULTS

GROUP A.—The complement-fixation test was carried out on samples of serum collected at random during the past few months from specimens sent in for the routine Wassermann test. The results are given in Table I, together with those previously obtained (Group B) during 1936 (pre-epidemic period)

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from a similar group of sera, and (Group C) from a group of convalescents after the epidemic in January, 1937 (Hoyle and Fairbrother 1937). The results given by the sera recently collected were similar to those obtained during the pre-epidemic period in that there was an absence of high titres. None of the pre-epidemic sera had a titre as high as 1 : 32 and only 2 per cent. of the recently tested sera gave this reading. Comparing the two series within the range of 1 : 16 to 1 : 8 it is seen however that the titres of the recently collected group were somewhat higher. These are nevertheless in sharp contrast with the convalescent sera, 55 per cent. of which gave a titre of 1 : 32 or over. The absence of high titres in the recently examined Group A is of particular interest and appears to be due either to the absence, in the group, of persons infected during the epidemic or to the fact that the high titres resulting from an attack of the disease are not maintained for any length of time. The latter possibility seems more probable in view of the widespread nature of the 1936–37 epidemic and the somewhat higher readings given by the group as compared with the pre-epidemic group.

GROUP B.—Further examinations were carried out on sera obtained from those who had definite attacks of influenza during the epidemic of 1937. The clinical diagnosis was confirmed in each instance by either direct isolation of the virus or serological tests. In a few cases samples of serum had been collected before the attack and also during late convalescence. Complement-fixation tests were carried out in all cases and neutralisation tests in a few. The results are given in Table II. The high titres given by many of the convalescent sera were not obtained with the samples collected some 10–12 months later. In each case there was a decline in the antibody content, and this in many was considerable. The fall was greatest where the convalescent samples had given relatively high values. The investigation was mainly concerned with the complement-fixing antibodies, but the results obtained in the few cases where neutralisation tests were carried out indicate that the neutralising antibodies showed a comparable fall. The results however were always quantitatively parallel. There was no appreciable alteration in the titres of the convalescent sera—which had been ampouled and kept at 0° C.—except that, where a preservative had been added they tended to be anticomplementary.

TABLE II—FLUCTUATIONS IN ANTIBODY-TITRE FOR NINE PATIENTS RECOVERED FROM EPIDEMIC INFLUENZA

Case No.	Complement-fixation test.			Neutralisation test.		
	Jan., 1937: Before infection.	Feb., 1937: Convalescent.	Jan., 1938.	Jan., 1937: Before infection.	Feb., 1937: Convalescent.	Jan., 1938.
1	0	64	2	0	16	1
2	—	32	16	—	—	1
3	—	64	16	—	—	2
4	+—	32	4	0	16	2
5	—	32	2	—	—	2
6	+—	8	4	—	—	2
7	+—	4	2	1	4	1
8	—	8	4	—	—	—
9	—	32	8	—	—	—

Figures = titre (original serum-dilution).
+— = doubtful in lowest dilution.
0 = negative. — = not done.

GROUP C.—In this group have been arranged the subjects who escaped infection during the 1937 epidemic. The examinations were carried out at intervals of 10–12 months (Table III). Little difference was found in the titres given by the sera of this group after an interval of 11 months. In two instances (Cases 1 and 6) it is interesting to note that complement-fixing, but not neutralising, antibodies were found in the second test, as fixing antibodies usually disappear more quickly than neutralising antibodies; the titres were, however, low in all cases.

TABLE III—FLUCTUATIONS IN THE ANTIBODY TITRE OF ELEVEN NORMAL SUBJECTS

Case No.	Complement-fixation test. 1937.		Neutralisation test. 1937.		No.	Complement-fixation test. 1937.		Neutralisation test. 1937.	
	Jan.	Dec.	Jan.	Dec.		Jan.	Dec.	Jan.	Dec.
1	16	8	—	0	7	2	+—	—	—
2	0	0	0	0	8	0	0	—	—
3	0	0	2	0	9	2	+—	—	2
4	0	0	2	2	10	+—	+—	—	0
5	2	2	—	1	11	2	2	—	0
6	8	4	—	0					

DISCUSSION

The results recorded above support the view expressed by Francis and his colleagues (1937) that the antibody content of convalescent serum is not maintained for any length of time. They found in their series that at the end of 3–5 months there was an average decline of 50 per cent. in both the fixing and the neutralising antibody; the fall was greatest when the convalescent serum had given a high titre. Our findings have been similar; at the end of twelve months the antibody fall has progressed even further.

These results offer an explanation for the relatively short duration of immunity in influenza. There is an appreciable increase in antibodies following infection, but these tend to disappear rapidly and in many cases the titre at the end of twelve months once more is in the susceptible zone. The resistance of such individuals undoubtedly falls in a comparable manner. While they possess some basal immunity that might offer a limited amount of protection against the homologous strain of the influenza virus, it would probably be of little value in resisting infection with heterologous strains, should such strains exist under natural conditions. It has been suggested that there are several distinct strains of the human influenza virus and that while these show definite antigenic overlap, there are distinct immunological differences (Andrewes 1937). Infection with one particular strain would not therefore give rise to a high degree of immunity against the others. Conclusive evidence of this has not yet been obtained. It is, consequently, not possible at present to give any final opinion on immunity to influenza, but it does appear to bear a definite relationship to the antibody concentration of the serum. An important factor in the short duration of the immunity following infection is the failure to maintain the increased antibody concentration.

In the apparently normal group the antibody titres were low and showed little fluctuation. This

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is not surprising, as while the fixing and neutralising antibodies are distinct, they are specific and are only produced either by infection with, or inoculation of, the virus.

SUMMARY

After an attack of influenza there is a considerable increase in the antibody content of the serum; this high level is not maintained and after 10–12 months the titres tend to fall to a level similar to that given before infection.

There appears to be a definite relationship between immunity to influenza and the presence of antibodies in the serum.

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VITAMIN K IN HUMAN PATHOLOGY

BY HENRIK DAM and JOHANNES GLAVIND

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VITAMIN K is known as a fat-soluble food constituent that protects certain birds from a characteristic hæmorrhagic disease. This disease and the factor that prevents it were seen and studied by one of us (Dam and others 1929, 1930, 1935–38), the investigation being continued in collaboration with Schønheyder, Lewis, Tage-Hansen, and Glavind. Independently but later, the work also was taken up by Holst and Halbrook (1933) and Almquist and Stokstad (1935, 1936).

ACTION AND SOURCE

The disease is characterised by a great tendency to hæmorrhages and a diminished clotting power of the blood, due to reduced prothrombin. The possibility of a simultaneous decrease in capillary resistance has been attended to but not definitely settled. When chicks are given a diet free from vitamin K, they usually show the disease after 14–24 days. Addition of lemon juice does not prevent the disease when vitamin K is lacking. Rats, guinea-pigs, and young dogs may live and thrive for a long period without vitamin K, but recently the disease has been produced in rabbits and cured by the vitamin (Dam and Glavind unpublished).

Food constituents rich in vitamin K are green leaves, while cereals and carrots are poor sources, and potatoes, mangolds, lemon juice, and cod-liver oil are practically devoid of the vitamin. Yeast and wheat-germ oil are also poor sources. The vitamin may be prepared in the form of very strong concentrates.

Animals that can apparently dispense with vitamin K probably get it from bacterial processes in their intestine. Human subjects receiving a K-free diet for about a week still have a large quantity in the lipoid fraction of the fæces. Urine does not contain the vitamin even when the diet is rich in green vegetables.

It is known that lack of bile in the intestine due to obstructive jaundice or to a bile fistula leads to a hæmorrhagic diathesis and the view has been held (Vadsten 1936) that decreased absorption of fat-soluble vitamins may be the cause of this condition. The only fat-soluble vitamin that is known to prevent a hæmorrhagic diathesis is vitamin K, and it is therefore of great interest to know whether this substance is the one involved in this or other hæmorrhagic conditions in man. The view might also be held that the normal human organism has the power of synthesising the vitamin and that the synthesis is stopped in certain pathological conditions associated with a hæmorrhagic tendency.

METHOD OF ESTIMATION

We have elaborated a method that enables a rapid investigation of the possible relation between human diseases and avitaminosis K in chicks (Dam and Glavind 1938b). This method is a modification of that developed by Albert Fischer (1930) for avian blood, rendered available for human and mammalian blood by the addition of a certain quantity of heparin. The action of the blood-platelets in the clotting process is thus completely eliminated, but the power of the plasma to react with tissue extract is not impaired to such an extent that it is impossible to measure the clotting power and thereby to estimate a reduction of the coagulability of the same kind as is met with in K-avitaminous birds. The method is as follows:—

From an arm vein 4 ml. of blood is taken through a paraffin-coated cannula into a paraffin-coated centrifuge tube containing 0·2 ml. water with 0·3 mg. of a heparin preparation having a coagulation valency of 0·40. The contents are gently mixed, cooled in ice and centrifuged. The plasma is tested in Fischer's apparatus by placing 4 drops into a micro-test tube mounted in a suitable frame and adding 1 drop of a human brain extract, which has been stored in ampoules in frozen state. By placing the frame in a constant water bath and turning it at intervals of 15 sec. the clotting time is measured.

Repetition of the experiment with varying concentrations of the tissue extract enables one to determine the concentration that produces clotting in 3 min. The concentration (Kn) corresponding to a normal human plasma does not vary much for different individuals when a constant tissue extract is used. The concentration (KK) corresponding to a plasma with materially reduced prothrombin is much higher. The quotient (R = K/Kn) indicates the reduction of the clotting power against tissue extract. The reciprocal value 1/R will be a direct measure of the clotting power. For K-avitaminous chicks the R value is increased and may in fully developed cases be 100 or more. This increased value is also found when heparin has been added to the birds plasma. For normal persons the R value is theoretically 1, but there is a limited individual variation. When plasma has been stored for some hours before the estimation is made, figures between 0·6 and 1·7 are still considered normal.

RELATIONSHIP WITH CERTAIN DISEASES

A summary of an investigation of certain diseases which may be expected to influence the R value is given in the Table (Dam and Glavind 1938b). It is seen that a very reduced platelet count has no influence on the R value. Normal values are also found in hæmophilia, a fact in accordance with the view held by Howell and Cel[illegible] (1926) that the coagulation defect of this dis[illegible] confined to the platelets, and in contradictio[illegible] view of Patek and Taylor (1936) that ha[illegible] is caused by a change in prothrombin. I[illegible] to be expected

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that attempts to treat essential thrombopenia and hæmophilia with vitamin K will be in vain. The few cases of sprue (without hæmorrhagic diathesis) and of acute hepatitis must be supplemented by others before definite conclusion may be drawn from the normal R values found in these conditions. In the last group—obstructive jaundice from different causes—5 out of 7 cases have definitely raised R values. All do not show spontaneous hæmorrhages, but it is to be supposed that these may be seen sooner or later when the R value is increased.

TABLE SHOWING DISEASES AFFECTING THE R VALUE

Disease.	R value.	Thrombocytes (thousands per c.mm.).	Tendency to spontaneous bleeding.
Thrombopenia	1·0	6–12	+
	0·74	40–50	+
	0·65	12– 3	+
	0·8	26	0
Aplastic anæmia ..	0·8	40	+
	1·0	10	+
	1·3	Normal.	+
Hæmophilia	1·2	"	+
	1·0	"	+
	0·7	"	+
Non-tropical sprue (adult)	0·75	"	0
	1·4	"	0
Myeloma	0·6	"	0
	0·9	"	0
Acute hepatitis ..	2·7	"	0
	2·0	"	0
	1·1	"	0
Obstructive jaundice—			
Cholelithiasis ..	1·0	"	0
Cancer	10·0	"	0
"	23·0	"	+
"	5·6	"	0
Cholelithiasis ..	5·4	"	+
Cancer	9·0	"	0
Cholelithiasis ..	1·1	"	+

A series of investigations that need not be detailed in this paper (Dam and Glavind 1938b) render it highly probable that the increased R values in this group are due to reduced prothrombin, and the view that obstructive jaundice is associated with reduced prothrombin has also been held by Hawkins and Brinkhous (1936).

CLINICAL TRIAL

It is known (Dam, Glavind, Lewis, and Tage-Hansen 1938) that an intravenous injection of a vitamin-K concentrate may restore the clotting power of the blood of K-avitaminous chicks in about 5 hours; an intramuscular injection is also very active, even if a somewhat longer time is required, while for a subcutaneous injection it is necessary that the vitamin should be in a water-soluble form.

We have therefore given intramuscular injections of K-vitamin concentrates to three of the patients with increased R values.

In the first—a case of obstructive jaundice due to cancer—having an R value of 5·6 immediately before the injection, the patient got on 3 days 15 mg. of a K concentrate with a strength of 3000 units per mg. (The units are related to a standard dried spinach containing 550 units per g.; the injected quantity therefore corresponds to 90 g. of dried spinach per day.) On the fifth day after the first determination the R value was 1·3 and after a further two days it was 1·2.

In the second case—obstructive jaundice due to cancer—the R value was followed through a longer period before the injection. The initial value found for R was 23; 13 days later it was 21, and 51 days later 78. Immediately afterwards the patient received in 5 days 15 mg. (50,000 units) per day by intramuscular injection—corresponding to approximately 1 unit per g. body-weight; on the sixth day R was found to be 1·4.

In the third patient—a case of cancer—the initial R value 9 rose to 33 in the course of 20 days. The patient now had intramuscular injections of vitamin K (45,000 units per day) on 4 subsequent days. On the fifth day the R value was found to be 4 and on the seventh 2·8.

CONCLUSIONS

It is thus justifiable to conclude that the parenteral introduction of vitamin K has rendered the clotting power normal and that the increased R value before the introduction was due to reduced absorption of vitamin K from the intestine.

Animal experiments with bile fistula rats have been carried out by Greaves and Schmidt (1937) who found that an excess of vitamin K in the food counteracted the hæmorrhagic diathesis, and after the present work was finished Warner, Brinkhous, and Smith (1938) reported that the action of alfalfa extract mixed with bile and given by mouth was superior to the usual bile therapy.

We are aware that the experiments given in this preliminary communication must be supplemented by a careful clinical investigation, but the fact seems already to be secured that the treatment with parenteral introduction of vitamin K will completely substitute the old bile therapy.

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Clinical and Laboratory Notes

OBTURATOR HERNIA

By R. H. Franklin, F.R.C.S. Eng.

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According to Erichsen (1884) the condition of obturator hernia was first noticed in the early part of the eighteenth century. The condition is rare and most of the reported cases have occurred in women over 60 and often there is a history of emaciation following obesity. The following factors affecting the ætiology are generally accepted: (1) The obturator opening is relatively larger in women than in men. (2) Frequent pregnancies cause laxity of the peritoneum. (3) Emaciation removes the cushion of fat normally occupying the obturator canal. (4) Extraperitoneal lipomata may account for the origin in some cases.

Lejars (1936) describes three types:—

(*a*) The sac traverses the entire length of the obturator canal from behind forwards and emerges from the anterior orifice and spreads out in front of the obturator externus and under the pectineus.

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(*b*) The sac emerges between the upper and middle fasciculi of the obturator externus and becomes encircled and constricted by a double muscular band.

(*c*) The sac burrows from above downwards between the two layers of the obturator membrane and remains entirely behind the obturator externus muscle.

Generally the condition has been discovered during laparotomy for acute intestinal obstruction; occasionally obstruction associated with a fullness in Scarpa's triangle and pain referred to the distribution of the obturator nerve has led to the correct diagnosis being made before operation. Even more rarely the diagnosis has been made before strangulation or obstruction has occurred. Milligan (1919) describes such a case in which he was able to approach the canal and repair the hernia from the inguinal route. Rendle Short (1923) records having found the condition at operation for acute obstruction.

On account of the patient's condition no attempt was made to close the obturator canal after the hernia had been reduced. After 21 months, at the age of 77, the patient presented herself again with a recurrence of obstructive symptoms. The hernia was again reduced from within the abdomen and, on this occasion, the canal was closed by cutting a piece of rib cartilage corresponding in length and diameter to the canal, inserting this into the canal, and drawing the peritoneum over it by means of a purse-string suture. No attempt was made to identify the position of the vessels and nerves.

A better method of dealing with the sac is that suggested by Grey Turner (personal communication), namely, to invert the sac from within and place a ligature around its base. To do this a pair of artery forceps is inserted through the neck of the sac grasping the fundus. The sac is inverted by drawing the forceps out again.

CASE REPORT

A widow of 68, having one grown-up son, was admitted to Hammersmith Hospital on Oct. 30th, 1937, complaining of abdominal pain and vomiting of four days' duration. The pain, which was colicky in nature, was situated in the umbilical region and did not radiate. It varied in intensity but never left her entirely. She vomited 4½ hours after the onset of the pain without relief. She took nothing by mouth except sips of water. She vomited again five or six times during the four days and she volunteered the statement that the vomit gradually became "like her motions." She passed a small motion on the second day, but no flatus during the whole of the four days. In her past health she had been becoming increasingly constipated during the previous twelve months. During the same period she suffered from a troublesome cough and flatulence and discomfort after meals. She had noticed a small swelling in the midline of the neck, which had been present for forty years and had never caused her any trouble. She did not think that she had lost weight recently.

On admission.—Slight generalised wasting. Cyanosis of lips. Temperature 98° F.; pulse-rate, 76; respirations, 20. Tongue clean and moist. An adenoma of the thyroid, the size of a walnut, was present in the midline. She complained of colicky pain in the umbilical region, but was not vomiting.

The abdomen was slightly and uniformly distended; no visible peristalsis. On palpation it was found to be soft and slightly tender all over. The lower border of the liver was palpable. No other organs and no masses could be felt and a careful examination of the hernial orifices showed no abnormality.

By auscultation, peristalsis was increased all over the abdomen. Heart and lungs: râles at both bases; blood pressure 130/70 mm. Hg. Rectal examination: no abnormality found. Urine: trace of albumin.

Diagnosis.—Acute on chronic obstruction.

Operation under a spinal anæsthetic (10 c.cm. of Percaine 1–1500). As a preliminary to operation a duodenal tube was introduced through the nose and 6 oz. of thin, brown, fæcal smelling, intestinal contents withdrawn. An injection of omnopon gr. ¼ and scopolamine gr. 1/150 was given. The abdomen was opened by a low right paramedian incision and free, straw-coloured fluid was present in the peritoneal cavity. Distended and reddened loops of small intestine were seen. The cæcum was not distended. A loop of collapsed small intestine was found and followed down into the pelvis. It had herniated into the right obturator canal. After gentle traction had been applied from within, the hernia was reduced and it was seen that there had been a Richter's type of strangulation involving a circle of bowel wall ½ in. in diameter. The affected portion was dark red in colour and bulging. The gut appeared viable and peristalsis appeared while it was being watched. Two catgut interrupted Lembert sutures were introduced to infold an area over which the peritoneum appeared to be damaged. An examination was made of the obturator opening and it was found barely to admit the tip of the little finger. No attempt was made to repair the obturator canal and the abdomen was closed. The nasal tube was allowed to siphon throughout the operation and 10 oz. of foul-smelling, brown fluid escaped in this way.

Progress.—After the operation the patient was given 800 c.cm. of intravenous glucose saline slowly. The nasal tube was left in situ and aspiration was carried out periodically after the operation (see Table). She was encouraged to drink after each aspiration. The volume of aspirated fluid rapidly diminished and within a few hours lost its fæcal smell. Her convalescence was interrupted by the formation of a subcutaneous hæmatoma, but in five weeks she was discharged from the hospital feeling well and with the wound soundly healed.

TABLE OF ASPIRATIONS OF STOMACH THROUGH DUODENAL TUBE

Time.	Amount aspirated (oz.).	Time.	Amount aspirated (oz.).
FIRST DAY		SECOND DAY	
5 P.M.	6	1 A.M.	1½
In theatre.	10	3.20 A.M.	2
8 P.M.	5	4.30 A.M.	½
9 P.M.	1½	6 A.M.	½
10 P.M.	1	8 A.M.	½
11 P.M.	1	10 A.M.	½
11.45 P.M.	½	11 A.M.	Tube out.

An inquiry was afterwards made as to the presence of pain referable to the obturator nerve, but it was found to have been absent.

CONCLUSIONS

(1) Diagnosis is seldom made except at operation.

(2) Pain referred to the inner side of the thigh is inconstant.

(3) Owing to the variations in the relation of the hernial sac to the obturator vessels and nerve, the approach from the thigh is hazardous and should not be attempted.

(4) As in all cases of obstruction, the use of the duodenal tube, as advocated by Wangensteen (1937) is a therapeutic measure of inestimable value.

I am indebted to Prof. Grey Turner, director of the department of surgery, and to Sir Frederick K. Menzies, chief medical officer of the L.C.C., for permission to publish the report.

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A NEW TECHNIQUE IN EMBOLECTOMY

By D. Lang Stevenson, F.R.C.S. Edin.

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I had the opportunity recently of removing an embolus from the main artery of the upper limb. The use of a special needle proved so effective in facilitating an operation that might otherwise have been difficult or even unsuccessful, that the method seems worth recording.

In this case an embolus had lodged in the upper part of the brachial artery. The vessel was exposed in its upper third and was found occluded with clot from where the profunda branch is given off to beyond the exposed part of the axillary artery, at which level transmitted pulsation could be detected. The lower part of the thrombus was withdrawn by means of forceps and probe, but it became increasingly difficult to extract the upper part of the thrombus by the usual manœuvres. At this stage a special needle was used which it had been anticipated would prove useful. This needle was described recently (Stevenson and Walker 1938). It is 10 in. long and has a ball on the end a little over ¼ in. in diameter, through which the needle passes. The needle was inserted up the artery as far as the clot and suction applied by means of a Record syringe. A long piece of thrombus was easily withdrawn adhering to the needle like a limpet. The small spurts of blood that followed indicated that some clot still remained in the upper and unexposed part of the axillary artery. This time the needle was passed up for a distance of about 5 in., strong suction being maintained all the time. The remaining portion of thrombus was withdrawn followed by a gush of blood. The incision was closed and the circulation in the limb restored.

From this experience, and that gained from seeing four other embolectomies, it is thought that the manœuvre should be a real advantage in making the operation quicker and simpler as well as more certain of success, especially where secondary thrombus extends for a considerable distance into the more inaccessible part of the artery. In the case just described it is probable that if this needle had not been available a much more extensive dissection would have been required necessitating division of the pectoral muscles and even further incision of the vessel itself.

The technique has thus several advantages. The smooth ball end does not damage the delicate intima. A very small incision, just large enough to admit the head of the needle, is sufficient. It is suggested that a transverse incision might have an advantage over the usual longitudinal one, since it causes less constriction of the lumen when sewn up. The ball-ended needle is also useful for the purpose of syringing out the vessel with citrate solution before closing the incision.

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MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF PHYSICAL MEDICINE

At a meeting of this section held on March 18th the chair was taken by Dr. F. D. Howitt, the president, and a discussion on

Physical Education

was opened by Lord Dawson. He said it had an important bearing on the crisis in which the nation was concerned. The country had had a call, not to arms, but to gird up its loins. Planning was essential for a strength in manhood as in everything else. Modern physical education might be said to have originated in Denmark in 1804 when it had been made a part of the school curriculum. The idea had fallen on stony ground in this country, so long the home of games. In 1915 the gymnastic movement had come to the fore, an important part having been played by the British Army. Athletics, games, and folk dancing were used to ensure strength, suppleness, and beauty, and to develop the team spirit. The combination of physical training with games and sports, advocated by Niels, was the method of choice in Great Britain. The Board of Education had steadily extended its field of physical education, which to-day occupied an important place in the curriculum of elementary schools. Further, the Army school of physical training had acquired increasing reputation and influence. On the other hand, universities and public schools had been slow to admit that their system of games needed to be supported by a system of training. Naturally, the rising enlightenment had not as yet direction proportional to its force. Thus arose the importance of the medical profession making this subject its own. Knowledge of the growth and health of the body rested on the medical sciences. The medical man was an educationist of the body as the schoolmaster was an educationist of the mind, and they needed to work together. Imposition of a central plan by the Government would have upset and antagonised local activities and might have raised the bogy of militarism. Therefore the slower methods of the Council of Physical Training and grants-in-aid were pursuing their way.

Games produced a harmony of body, mind, and character, but deficiency in games might not argue defect of frame or function, and games might overstrain their votaries. There was a tendency to focus attention on boys who had the aptitude to do well, so that the dull or mediocre players left school with uneducated bodies. Sports and games were the fulfilment of physical training and should rest upon it. It developed qualities which were basic: posture, poise, flexibility, rhythm, and good respiration. Good posture was not innate but had to be taught—perhaps because the erect posture had been but recently evolved. It was first a conscious effort of the cortex, but later passed to the control of the midbrain, and so became natural. Given good posture and good carriage, all other things would be added. Body and mind worked together. Muscles and nerves must be well nourished and adequately rested; thus posture involved sound nutrition and sleep. Muscle relaxation was precedent to any repose of mind—a fact not fully recognised by doctors. Often muscles and nerves remained taut after work was finished. Much could be learned from observation of a good sporting dog. The time had come to survey accepted principles in the light of physiological knowledge. Research had greatly enriched this field of knowledge in recent years. The postponement of fatigue by sugar, the raising of glycogen reserves by two days' rest before effort, and adequate rest after effort were examples. Basal metabolism during training increased; according to theory it should decrease as the machine got run in. The metabolism of muscle was not agreed on, but no one doubted the importance of an adequate supply of oxygen. The

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oxygen debt a man could incur depended on training; the strength and coördination of the respiratory muscles conditioned his success in games and sports.

If this was to be a nation-wide movement there must be more and the best provision for training teachers. These services had not been accepted as of primary national concern in this country in the way they had in Scandinavia. The Government had decided to establish a college where anatomists, physiologists, and teachers of physical training would work side by side, studying the whole man. Physical education would need the responsible guidance of trained doctors. School medical officers in the future ought to have a course in the national college. A new sphere of work was opening out for young doctors, whether as a specialty within general practice or as part of the sociological services which were bound to come more and more into prominence. Moreover, the physiology of work and leisure offered an interesting field of inquiry. Physical training must not lose touch with the cognate subjects of right feeding and adequate repose. The increase of scientific knowledge and of the social conscience had caused survival of a larger and larger number of the unfit. An alternative policy to Nature's "survival of the fittest" must be instituted. The task was made more difficult by increasing urbanisation; by increasing specialisation in industry, leading to over-development of one part and under-development of the whole man; by machinery; and by speed, which encouraged the ready-made rather than the self-made. The best of the youth should be pushed to the fore, so that youth leaders created a standard for their own generation. Loans might be granted to medically approved marriages; and we should establish motherhood clinics, and otherwise plan for improved stock. Competitive examinations should be made a test of physical as well as mental fitness. No standard type of body was wanted; quality, proportion, and effectiveness must be considered.

A SURVEY OF EUROPE

Prof. B. A. McSWINEY described his tour of European countries in the interests of physical education. He had visited Copenhagen, Lund, Amsterdam, The Hague, Paris, Rome, Vienna, Prague, Warsaw, Berlin, Dresden, and Munich. The purposes of physical education varied considerably in different countries. The attitude in Denmark was to ensure uniform bodily development and control, and to be sure that the child had moderate strength and an idea of discipline. In Italy the idea was to inculcate a faith and conception of life, to make all young people form a part of the State, and to teach them to live dangerously. The masses were to acquire discipline and will and to be organised in a military manner. There was a general movement in most countries to stimulate interest in exercise, but games did not take a prominent place. It was impossible to provide sufficient playing space in cities, and gymnastic work had certain advantages. In some countries the climate prevented outdoor sports for several months of the year. Too much attention had been paid to rigid systems of training in the past, and for this reason gymnastics were not universally popular; flexible methods were being developed on eclectic principles in all centres. The investigators had concluded that an international system would be impossible and was probably not desirable; what suited one nation did not suit another. No system was founded on exact knowledge of the effects of exercise on the functions of the body. The time allotted in schools varied from one to five hours a week, and other subjects were considered first. Unfortunately the exercises could not be arranged on a basis of equal fitness, but must be on the ordinary class basis. In many areas the otherwise useless roof space was utilised for gymnasia. In Germany the aim was a daily exercise, swimming instruction, and uniform physical education. Children received tests before leaving the elementary school. The young people received further training in the Hitler youth organisations. In most European countries no special provision had been made for adolescents, adults, or the unemployed, but private clubs were numerous and active in Sweden and Denmark. In Italy and Germany boys and girls passed from the children's clubs into young Fascist organisations which kept the girls till the age of 25 and the boys until their military service. There were clubs for the unemployed and for private members in Italy, both for men and women. In Germany the lad of 19 left the Hitler youth and joined the Labour service before military service; after that he joined sports clubs and party organisations which offered facilities for all kinds of sports and games. There seemed to be little coöperation between school medical officers and physical instructors—"sports doctors" judged the capacity of boys to participate in exercise, but had no opportunity to estimate results. Too much rested on the teachers. Medical men taking up school work ought to have a special period of study. In some centres fine work was being done for the below-normal physical type, but on the whole these people were rather neglected.

There was little knowledge of the effects of exercise on the functions of the body. It was an important factor in development and increased muscle strength, coördination and efficiency, and developed flexibility of joints and good posture. It trained the body to work more efficiently. In moderation it caused a sense of well being, but there was no evidence that it made the body more resistant to disease. Physical education could not be developed as a separate subject; the close connexion with nutrition must be recognised. Attention should be paid to children and adults whose condition was below normal. The medical man must be trained so that he was able to take over the control of the nutrition and physical education of school-children. The profession must realise the problem that faced it in understanding the development of the body and the resulting gift of health.

PHYSICAL TRAINING AND THE SOLDIER

Major W. CAMPBELL said that the first whole-time medical officer to the Army training school had been appointed in 1922. A hygiene specialist had been selected, and preliminary training had been essential. The training had begun with three months' physical training to teach him what the exercises meant; then there was a course in the physiology of muscular exercise and energy expenditure. In the school he had to discuss matters of physical training with instructors of great experience. There was thus close liaison between the teaching and the medical side. The officer's duties included instruction and research. Physical training was based on medically sound lines, and the future instructors were taught anatomy and physiology by the medical officer, with the aid of the skeleton and the living model. First-aid instruction was included in the advanced and vocational courses. Routine tests and charts were made for all the men, including vital capacity, reaction times, grip-test, and exercise-tolerance tests. Research included an inquiry into energy expenditure to grade the various

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exercises, and the effect of smoking on endurance. There were exceptions to the obvious rule that smoking militated against endurance. An inquiry had been made into the value of rhythmical breathing in walking.

Usually four courses were running: probationers', vocational, assistant instructors', and advanced. The assistant instructors were young men chosen by their superior officers for a three months' course; the most promising took the advanced course for another three months. The best of these were recalled later from their depôts, after teaching experience, for the probationers' course, and these again, after further experience, might be selected for the staff.

DISCUSSION

Sir ARTHUR MACNALTY pointed out the uselessness of preaching physical fitness to an unresponsive nation; of recent years there had been increasing interest in the open-air cult, due to urbanisation, better wages, more holidays, Boy Scout and Girl Guide movements, and better knowledge of the laws of health. Progress in physical education in schools followed several lines of advance. The old-fashioned cramped school was being replaced by light, airy buildings with ample playing grounds. Nutrition was attended to by local authorities; proper meals and sufficient milk were essential. Health demanded a right habit of living, and the Board of Education regarded adequate physical training as an essential part of the child's education. Without trained teachers and leaders the fullest use could not be made of the facilities available. Full use should be made of the services of preventive medicine, lest zeal outrun discretion. One part should not be developed at the expense of another, and the body should never be developed at the expense of mind and spirit. Exercises might be misused and misapplied. There was great need for watchfulness in observing their effects, and for caution that they were not overdone.

Mr. PHILIP WILES said that the rapidity with which the Government scheme of physical training had been introduced had caused some doubts among the medical profession, but Lord Dawson had gone far to allay those doubts. Undoubtedly the physique of the nation was in a bad way, and one method of improving it was physical education. But a quarter to a half of the population were receiving less food than they ought; and in those circumstances doctors had to be careful how they advised people to take on the additional effort of physical training. No one should be encouraged to join such schemes unless they were getting enough to eat to ensure that they derived benefit. In Moscow everyone who joined a sports club had to be examined by a specially trained medical man before participating in its activities. Not only the apparent fitness but also the amount of food available needed to be taken into consideration.

Sir ROBERT STANTON WOODS said that the Aldershot school was a school in the best sense of the word; it should be inspected by all interested in the subject. It was the inescapable duty of every medical man to afford help to the limit of his capacity and opportunity. Education of the body was the preventive side of physical medicine. He pleaded earnestly for the stimulation in every teaching hospital of an active interest in this branch of medicine and hoped people would not be easily discouraged by opposition.

Lord DAWSON, in reply, urged that caution should not be a shelter for inertia.

SOCIETY OF MEDICAL OFFICERS OF HEALTH

A MEETING of this society was held on March 18th, with Dr. JAMES FENTON, the president, in the chair.

Dr. ARTHUR MASSEY (Coventry) opened a discussion on

Hospital Policy in Relation to Preventive Medicine

by drawing attention to the germ of a coördinated hospital policy for the country, contained in the provision of the Local Government Act, 1929, that local authorities must consult with the governing bodies and medical staffs of the voluntary hospitals in their area on questions relating to the provision of hospital accommodation. This proviso did not, however, appear to be reciprocal. Nevertheless, in the more progressive and enlightened areas a great deal of progress in liaison with the voluntary hospitals had been made, particularly through the appointment of the medical officer of health to the staff or to the management committee of the local voluntary hospital. In Coventry they were making a new departure with a joint laboratory under a committee composed in equal numbers of representatives of the voluntary hospitals and of the public health committee. One difficulty, which had been overcome in most areas, was that contributors to Hospital Saturday funds and other contributory schemes were liable to find themselves in the position of having to pay twice over, in that their contributions did not entitle them to free treatment in the municipal hospitals.

What sort of quantitative provision of general hospital beds must local authorities provide? There were no general standards. It was conceivable that the Midwives Act, 1936, might have the effect of relieving the pressure on maternity beds by popularising domiciliary midwifery once more. As showing the very great increase in the demands made on the beds in municipal hospitals, Dr. Massey quoted figures from his own hospital at Coventry, showing that the number of patients passing through it in 1937 was three times greater than in 1927. As regards out-patient departments, it was not true that the provision of municipal out-patient departments relieved the pressure on those of the voluntary hospitals. A circle seemed to be set up in which the supply increased the demand. Opinion was sharply divided on the provision of municipal out-patient departments, particularly as to whether they should provide consultant services only or a general out-patient service. In internal administration, whereas the voluntary hospitals were almost exclusively administered by lay persons, the municipal hospital was run by a medical administrator and Dr. Massey put in a strong plea for the continuation and extension of the latter system.

Finally, Dr. Massey suggested that the future development of our hospital system might lie in the direction of a coördination of graded hospitals in regional areas. Regionalisation was easy for voluntary hospitals but raised serious administrative difficulties with municipal ones. However, since 60 per cent. of the general hospital beds of the country were in the hands of local authorities, the municipal hospitals could not possibly be ignored in any regional scheme. The final model had not yet been evolved and progress must be by evolution and not by revolution.

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Dr. J. FERGUSON (Surrey) thought that the development of public hospitals in the last eight years would prove to be as revolutionary a change in public health as the development of maternity and child welfare schemes in the early years of this century and that of sanitation in the first half of the nineteenth century. Indeed some medical officers feared that the attention given to hospitals might distract the medical officer of health too much from the more fundamental duties in connexion with preventive medicine, such as sanitation. Dr. Ferguson was not in favour of the complete absorption of voluntary hospitals into a uniform system but he felt that in many cases they had increased their accommodation regardless of failing income and that they should lay down for themselves a definite policy of limiting their services in order to prevent their income from being outstripped. The total quantity of beds required for general hospital purposes was probably round about four per thousand of the population but must necessarily vary with local conditions. In London the number provided was considerably higher, while in Surrey, which provided 1·6 voluntary beds per thousand of the population, they had estimated that 2·5 municipal beds per thousand would be required as a minimum and it was on that basis, for example, that the new 850 bed hospital at St. Heliers and the other great extensions now envisaged by his council were being undertaken.

He was not sure that the pendulum had not swung too far against the value of the isolation hospital as a preventive measure against infectious disease. Isolation hospitals were only a link in the chain, whose strength must be that of its weakest link. The public now rightly demanded that accommodation in isolation hospitals should be not less good than that in general hospitals and isolation hospitals had now to deal with a far greater variety of diseases and had to restore the patient completely to health, in addition to saving his life and isolating him from his fellows. The movement which had resulted in centralisation and the closure of the smaller hospitals was excellent; he thought that a minimum of 100 beds with a resident medical officer should be the standard to be aimed at. He was entirely in favour of concentrating the special departments such as chest blocks, tuberculosis, venereal disease, ophthalmic, rheumatism, and mental clinics at the general hospital. The V.D. and mental departments could only be effectively run if they had in-patient beds attached to them and this principle had been accepted by the Surrey county council at the St. Heliers hospital. Finally, he thought that an important plank in public hospital policy must be to raise the working conditions of the nursing and other staffs employed in them.

In reply to Dr. FENTON, Dr. FERGUSON agreed that hospitalisation was not always the best policy for young children, but they were forced into it by public demand; the 120 beds for children provided at St. Heliers were divided into wards of which the maximum number of beds in any one ward was four. He also agreed that research should not be dependent on charitable funds and must not be overlooked in municipal hospital organisation. Hospitals for the chronic sick were becoming preventive in character, since so high a proportion of the chronic sick could now be successfully treated.

The subsequent discussion produced a general agreement that municipal hospital progress since the passing of the Local Government Act, 1929, had been—to quote Dr. Elwin Nash—"staggering" and that the provision of an essential service such as hospital treatment could not much longer continue to depend, even in part, on appeals to public charity.

HUNTERIAN SOCIETY

Painful Feet

AT a meeting of this society held on March 21st, the chair was taken by Dr. DONALD NORRIS, the president, and a discussion on painful feet was introduced by a surgeon and a chiropodist.

SURGEON

The feet, Mr. NORMAN LAKE remarked, differed from the hands in that, apart from infections and injuries, painful conditions sometimes arose in them without any obvious cause. The solution of the riddle could only be found in the evolutionary history of the foot. The human foot was undergoing regression from a highly complex structure to a stereotyped one. Not only was the civilised foot encased in footwear, but the ground was artificially levelled for it, and it had merely to be placed on a level surface and to propel the body forward. In the pre-human apes, the great toe had been a separate structure like the thumb, capable of opposition to the rest of the foot. Its absorption could be followed by a study of the existing anthropoids. The incorporation of the great toe into the rest of the foot was quite recent, and the separation of its metatarsal bone from the others was the commonest of the painful conditions which occurred in the foot.

Along with this change, the size of the great toe had increased until it usually equalled the second toe in length. In the apes the first metatarsal was called upon to carry very little of the body-weight, most of it falling on an axis passing between the second and the third. Stresses would be distributed between those two bones. As a result, they were fairly stout, but the first was relatively thin and weak. In the human foot, the "axis of Morton" had passed to the interval between the first and second, and the stresses therefore now fell largely upon the first in the standardised mode of progression required of modern man. An evolutionary process of this kind was generally accompanied not only by weakness but also by variations. The relative lengths of the first and second metatarsal bones varied widely in individuals. Many foot troubles arose from the conflict between these variations and the stereotyped action required of the foot. Only the foot which had undergone the complete human cycle was suited to its work.

It was a mistake to be too optimistic in a case of pain due to atavistic lack of absorption of the inner segment of the foot. The characteristics underlying it were inborn. The object to be aimed at was to bring some of the strain of locomotion back on to the first metatarsal. The first segment was, however, obviously a very unstable segment in itself, and therefore if all the strain were thrown back on to it, difficulties would arise from its incompetence. The incidence of the strain must be shared by the toes: the second and third must be relieved as much as possible and more weight thrown on the first and fourth. When the second toe was unduly long and had been subjected to undue strain, or to wear and tear such as might produce an arthritis of the second metatarso-phalangeal joint, and where the first was properly stabilised, it might be better to throw all the strain back on to the head of the first. The alteration of stress was not easy. An attempt

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might be made to push the heads of the second and third metatarsals up out of the way by fitting a metatarsal pad immediately behind the head so as to raise it out of the position of carrying-strain in contact with the ground. Alternatively, an attempt might be made to build up the ground—i.e., by placing a support beneath the head of the first metatarsal so that it met the platform early and carried a greater portion of the weight. Modern footwear was not as bad as it was often represented, and—except for the feminine high-heeled shoe—it did not cause much unexplained pain. Primitive peoples who wore no shoes displayed almost as many painful deformed and ugly feet, with hallux valgus, hammer-toes, and so forth, as modern civilised people.

CHIROPODIST

Mr. J. H. HANBY, president of the Incorporated Society of Chiropodists, said that the most important material for the treatment of painful foot was felt. This was made in various thicknesses and compressions, ranging from a soft cushion to the hardness of piano-felt. The surface was often spread with an ointment. Sponge rubber was durable and had valuable applications, but was heat-producing and so a potential irritant. The two main purposes of padding and strapping were correction and protection. The general principle governing protective padding was equalisation or relief of pressure without interfering with general alignment. Corrective padding was used in an endeavour to bring into alignment those deviations from the normal which were sufficiently supple and amenable, and to assist in promoting the proper function of the foot. If the felt were not properly applied, it might do considerable harm. The pads had to be correctly shaped with scissors and the edges bevelled. When a pad was placed upon a foot at rest, the patient invariably dorsiflexed the toes, and immediately he stood up the pad would buckle in the centre. It should therefore be applied with the foot in exactly the position it would occupy in use.

Mr. Hanby showed various shapes of pads to protect various parts of the bony structure. Some patients, he said, especially in private practice, suffered from vascular corns under the first metatarsal bone, usually due to high heels and their traction on the extensor longus hallucis. In metatarsalgia, or "Morton's toe," relief could sometimes be given by placing a pad down the shaft of the fourth metatarsal, sometimes with a band round the foot. For a short first metatarsal the pad was taken directly over the head and extended into what should be its normal position. A depression was made underneath the head, so that the pressure was evenly distributed from the base to where the first metatarsal should be in the normal foot. The pad was brought underneath the shaft of the second so as to raise it slightly out of the way. He described the treatment of pes cavus, and remarked that much controversy existed over the question of whether there was a transverse arch. More trouble was seen under the heads of the second, third, and fourth metatarsal bones than in any other part of the foot. The correcting pad ran slightly inward to conform to the shape created by the metatarsal shafts, and passed immediately behind the heads so that the pressure was distributed over a large area.

A large number of thickened, malformed nails could be reduced almost to normal with the electric nail drill. This was painless, and of benefit to elderly patients to whom operation was neither acceptable nor desirable. In epidermophytosis the procedure had been to reduce or obliterate as much as possible of the fungoid tissue so that the dermatologist's treatment would be facilitated. Stockings were as important as shoes in bringing about deformities and painful conditions of the foot. The standardisation of footwear would only touch the fringe of the problem, for individual feet differed very widely. The task of the chiropodist would be made easier if shoe manufacturers would market shoes in lefts and rights and not in pairs.

DISCUSSION

Mr. C. LAMBRINUDI said that Guy's Hospital was the first to appoint a chiropodist in working coöperation with an orthopædic surgeon. So successful was the experiment that within a year an assistant had been found necessary. The chiropodist was as necessary as the masseur, for he not only eradicated painful peripheral foci but also cleared up corns, adhesions, and other troubles in the presence of which massage could not be used. The tips of the toes were quite as important as the metatarsal heads. From the physiological point of view, two reflexes had to be considered: that which inhibited the action of the interossei, and that which made them contract synchronously with the flexors. The afferent impulse for the prehensile action was a deep sensation; that for the ambulatory action arose from the skin of the soles of the feet. The work of the chiropodist was founded on a physiological basis, for if there were a painful focus on the foot the nociceptive stimulus predominated, and so the normal stimulus to the sole of the foot could not operate and the toes could not act properly.

Dr. J. B. COOK confirmed the value of chiropodists, and said he intended to do his utmost to assist them in their claim for recognition and to have one appointed at his own hospital without undue delay.

Dr. JACQUES FORESTIER said that he had not previously understood why any particular form of osteo-arthritis should be situated in any one of the metatarsal bones. Rheumatologists might learn much from Mr. Lake's explanation. He considered that some circulatory trouble was involved in Morton's metatarsalgia, for pain might come on suddenly without relation to pressure. Lipiodol injections between the metatarsal heads had given excellent results in a number of cases. Another case of pain in the foot might be papillomata of the sole; X ray treatment was effective in destroying these growths.

Dr. G. B. HEGGS said that the commonest infections of the foot were fungous infections and plantar warts. Both occurred in patients with moist and soft skin, and abnormal pressure was a secondary factor. Stockings were important. Many patients had corns due to fungous infection between the fourth and fifth toes, which were found to be habitually pressed together; separation by means of animal wool was of great value. To encourage the development of hard dry skin would do much to prevent foot pain.

Dr. F. McG. LOUGHNANE suggested, for the treatment of certain cases, the removal of the second metatarsal and the implantation of a bone graft.

Mr. A. E. MORTIMER WOOLF declared that the child was born with its feet in a position of varus, but that from the moment it began to stand it was subjected to the relics of military barbarism, for it was taught by all its elders to turn its feet out at an angle of about 45 degrees. This unnatural position had probably been imposed on soldiers to enable them to walk in close single file. The effect was to

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throw the whole weight of the body on to the sesamoid bones and displace them, so that the weight fell on the head of the first metatarsals. The feet of the athlete were slightly inverted. Sufferers should be taught to get the weight on to the outer sides of the feet, a practice which gave great relief to those fatigued by much standing.

Dr. P. B. SPURGIN regretted that the boots with a depression for the big toe, manufactured by a certain firm, had gone out of use. A very common cause of pain, and one often overlooked, was chronic tenosynovitis.

Dr. E. C. YOUNG spoke warmly of the measures which had been prescribed for him many years ago: boots built up on the inner side, a partition between the great toe and the others, and socks with a separate great toe.

Dr. GERALD SLOT, speaking of his experience at a rheumatic clinic, said that about 60 per cent. of children with alleged rheumatic pains of the feet were really suffering from defects which were at once remedied by exercise and correct footwear. To be effective, treatment must be faithfully carried out for some time. Genu valgum also sometimes produced conditions of the feet which were mistaken for rheumatism, and sciatic neuritis might be referred to the feet.

Mr. J. G. JOHNSTONE added inflammation of the fascia to the causes which had been mentioned, and considered that more stress should be laid on sepsis as a cause in adults as well as in children.

Mr. REX HILTON related that American investigators had found very few deformities in the African negro. Physiology was at once disordered when a foot was shod. Physical training instructors in America now taught a position of very slight eversion.

PATHOLOGICAL SOCIETY OF MANCHESTER

AT a meeting held on March 9th, with Dr. DANIEL DOUGAL, the president, in the chair, Dr. WILSON SMITH read a paper on the

Search for an Influenza Prophylactic

He said that a virus was first isolated in 1933 by the intranasal inoculation of ferrets with throat washings obtained from cases of influenza; since then many strains had been isolated by a similar technique all over the world. The ferret disease closely resembled human influenza in its symptomatology and the ease with which it was transmitted by contact of sick and healthy animals. The entry of virus into the respiratory tract was, however, necessary for infection; virus inoculated by other routes was innocuous. A lung-adapted strain of virus had been obtained, by serial passage under anæsthesia, which caused a much more severe illness, accompanied by lesions of pulmonary consolidation. Ferrets recovered from influenza were found to be completely immune to reinfection for a few months; then the immunity waned slowly, so that for some time experimental inoculation of virus was followed by a mild disease of short duration without any lung involvement. The resistant state was characterised by the presence of virus-neutralising antibodies in the blood.

The virus had been adapted to mice, in which animals it produced a virus pneumonia. By grading the dose of mouse-adapted virus, it was possible to obtain all degrees of lung involvement from small root lesions to complete consolidation of all lobes. Other ways of propagating the virus were by growth on the chorio-allantoic membrane of the developing chick embryo and by growth in a medium consisting of minced chick embryo and Tyrode's solution.

Dr. Wilson Smith said that ferrets, mice, and eggs had all been used in the search for a prophylactic against influenza. The tests employed to gauge the effect of vaccination upon resistance fell into two main groups: (1) tests in which the animal is exposed to infection, and (2) tests designed to measure the antibody level of an animal's serum. Antibodies were measured by virus-neutralisation tests in ferrets, mice, and eggs, or by the in-vitro complement-fixation reaction. Unfortunately the results obtained by these different tests showed puzzling discrepancies with some sera, and it was not yet known which test gave the truest measure of active immunity.

Vaccination of normal ferrets conferred a degree of resistance sufficient to protect against contact infection, but insufficient to protect completely against large doses of virus inoculated intranasally. The induced partial immunity, however, saved the lungs from involvement when the lung-adapted strain of virus was used for the immunity test. Vaccination of ferrets which possessed some residual immunity as a legacy from a past attack of influenza restored the solid immunity which they enjoyed immediately after recovery. Vaccination of mice resulted in the complete protection of a high percentage of animals, a reduction of mortality-rate, and a decrease of the extent of lung involvement in those not completely protected. Experiments with mice had been particularly useful for comparing the efficacies of different vaccines with a view to obtaining the most suitable product for use in man. Prophylactic experiments in human volunteers have been carried out in England with killed virus vaccines, and in the United States with living virus inoculated by non-infective routes. In all the experiments recorded vaccination resulted in a striking increase of serum antibodies. In the United States the reduction of the incidence of febrile respiratory disease in vaccinated as compared with control groups during subsequent epidemics augured well for the possibility of controlling epidemic influenza in the future. In England an epidemic had broken out too soon after vaccination for the results to be of much value.

The problem of efficient prophylaxis was complicated by the existence of antigenically different virus strains. The differences could be demonstrated either by cross-neutralisation tests with virus strains and their homologous antisera, or by cross-vaccination experiments in mice. Such experiments showed, however, that different strains possessed some antigenic components in common, and it was hoped that an efficient prophylactic might be obtained by the inclusion of several strains.

BRITISH HOSPITALS ASSOCIATION.—The Provisional Central Council set up to consider and advise how the recommendations of the Sankey Commission can be made effective have issued a letter to the secretaries of the regions of the association asking that special meetings should be called for the purpose of considering the present region boundaries, the adequacy of the service given, and generally to advise the council on local views and wishes. The council outline what services in their view should be found in a hospital region, which normally speaking should be based upon one central or "key" hospital. Members of the council are willing to attend meetings in the various regions of the association and discuss with representatives of the voluntary hospitals their difficulties and problems.

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REVIEWS AND NOTICES OF BOOKS

Heart Failure

By A. M. FISHBERG, M.D., Associate in Medicine, Mount Sinai Hospital, New York City. London: Henry Kimpton. 1937. Pp. 788. 40s.

THE conception of the circulation as a simple closed system of tubes through which blood is propelled by the pumping mechanism of the heart has been of great value in the teaching of medicine. This idea, which acquired greater significance with the increasing appreciation of the importance of myocardial function, now demands revision in the light of modern physiological researches. Dr. Fishberg holds that the methods evolved for the measurement of variables such as the circulation rate, blood volume, and cardiac output have resulted in a new understanding of the dynamics of the circulation comparable to the unravelling of the cardiac arrhythmias that followed the introduction of graphic methods. In the earlier chapters of his book he reviews the investigation of these variables and discusses the deviations that occur in cardiovascular disease. It is agreed that circulatory insufficiency may be due to heart failure or to extracardiac causes, although these two mechanisms are at times combined as in some cases of coronary thrombosis. The cardiac forms of circulatory failure may be grouped into the less common hypodiastolic form and the very frequent hyposystolic forms in which either the left or right ventricle may be at fault. Dr. Fishberg criticises the term "congestive" as applied to heart failure on the ground that congestion is inevitable if there is failure, even though the congestion is pulmonary and manifested solely by dyspnœa. This criticism may be accepted as valid, if only the more advanced grades of failure are under consideration; but the term is probably of value in relation to the grade of failure—"failure without congestion" implying the earliest stages of loss of reserve and "failure with congestion" denoting the objective clinical phenomenon.

The second section of the book deals with the clinical pictures of the principal forms of circulatory failure; among many valuable chapters are those devoted to the left-sided heart failure of aortic and of mitral lesions; failure in general cardiac strain (as in thyrotoxicosis); the hypodiastolic failures of pericardial disease and paroxysmal tachycardia; and combined cardiac and peripheral circulatory failure. The six chapters on treatment provide an exhaustive account not only of management and digitalis therapy but also of newer drugs such as quinidine, acetylcholine, and mercurial diuretics, and of debatable methods like thyroidectomy and the surgical treatment of anginal syndromes.

Dr. Fishberg has given the broadest interpretation to the term "heart failure," and the result is an authoritative, documented, and yet very readable treatise on cardiovascular disease from the standpoint of its all too common termination.

Modern Advances for Rural Practice

By P. C. DUTTA, M.B. Cal., F.R.C.S. Edin., Captain I.M.S., Civil Surgeon, Punjab. Calcutta and London: Butterworth and Co. (India) Ltd. 1938. Pp. 174. 6s.

THIS book is a collection of short papers on therapeutics issued from time to time to doctors working in the rural areas of India who lack ready access to modern text-books and medical journals. The notes are tabulated and in alphabetical order. The author has not sought to be original but has been content to summarise the views of others and has contrived to cover much ground. Thus, in the sphere of medicine, he discusses such matters as the treatment of the anæmias, the barbiturates, and the use of Solganol in tuberculosis. Many surgical conditions are considered but operative technique, except in such relatively simple procedures as the Steinach II operation for enlarged prostate or limbic paracentesis for acute glaucoma, is omitted. Prontosil in puerperal sepsis, Devegan in trichomonas vaginalis, and œstrogenic substances in senile vaginitis are some of the therapeutic measures discussed in the sphere of obstetrics and gynæcology. Just a few of the practices mentioned have already been superseded and should thus find no place in a book with this title. This is the only fault we have to find with a book that is essentially practical and should prove useful to a wider professional public than that for which it was originally intended.

Recent Advances in Pathology

Third edition. By GEOFFREY HADFIELD, M.D., F.R.C.P. Lond., Professor of Pathology in the University of London, Pathologist to St. Bartholomew's Hospital; and LAWRENCE P. GARROD, M.A., M.D. Camb., F.R.C.P. Lond., Professor of Bacteriology in the University and Bacteriologist to the Hospital. London: J. and A. Churchill. 1938. Pp. 420. 15s.

WHEN a book has given real satisfaction to the reader he is often reluctant to replace his well-worn copy by a more up-to-date version. There may be an excuse for a conservative attitude to a solid general text-book but the title common to the volumes of this invaluable series implies that the current edition of each should be at hand, though former issues had better not be discarded on its appearance. The usefulness of such a series indeed depends on the frequent renewal of its constituent volumes, especially those on subjects like pathology which are the growing points of medical knowledge; and it must be a matter of gratification to authors to be able to fulfil this demand—in spite of the onerous work involved.

The revision of this volume has been extensive and much important matter has been added to it. The first chapter, entirely new, deals with problems of infection with special reference to the question of the part played by bacterial allergy. The problem of allergy comes also into the discussions of lobar pneumonia, rheumatic fever, and nephritis. The chapters on the reticulo-endothelial system have been rewritten with the addition of a short review of those diseases classified as reticuloses. Many alterations have been made in the chapters on experimental cancer research, and more detailed information on carcinogenic agents has been included. Extensive developments have also been called for in the sections dealing with deficiency diseases, gastro-intestinal functions and anæmia, and disorders of the endocrine glands. Some chapters that appeared in the earlier editions of the book have been dropped, so that its size has not been greatly increased.

In the discussion on the reticulo-endothelial system some difficulty arises over the use of the word reticulum. The authors hold that this word "should be limited to be descriptive of undifferentiated

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mesenchyme and the lymphoid, hæmic or phagocytic cells derived from it together with their network of reticulin fibrils." They use the word reticulin to describe the substance of which argyrophil fibres are made, and they leave no word available to denote the network itself which, after all, would seem to have the strongest etymological claim to the term reticulum.

There can be no doubt that this book deserves its popularity. It is concise and lucid, and the selection of the material is even better in this third edition than in the earlier ones. The reviews of literature are comprehensive without being too involved, and even those readers who disagree with some of the conclusions reached will admit that the evidence is fairly and judiciously weighed. The work provides an excellent survey of recent advances in pathology.

Actinomycosis

By ZACHARY COPE, B.A., M.D., M.S. Lond., F.R.C.S. Eng., Surgeon to St. Mary's Hospital; Senior Surgeon to the Bolingbroke Hospital, Wandsworth Common. London: Humphrey Milford, Oxford University Press. 1938. Pp. 248. 15*s*.

IT is curious that a disease that has been known for sixty years, and is fairly common, should still be regarded as a rarity and receive scant notice in surgical text-books. This book will certainly make actinomycosis more prominent in the minds of clinicians, lead to its earlier diagnosis, and increase the prospect of its cure. Mr. Cope begins with an historical survey, discusses problems of pathology, and proceeds to a clinical description of the disease, ending his monograph with an appraisement of the various methods of treatment. It is all done well and in an attractive style. The extensive list of references shows the author has cast his net widely, though he disclaims having read them all—an honest admission rare in medical literature. His account of actinomycosis is not only authoritative but as complete as it can be in the present state of knowledge. This attractive monograph will certainly take its place as a book of reference for all interested in the subject, and —an unusual thing for a work of reference—it will actually be read.

Medical Bacteriology

Descriptive and Applied, including Elementary Helminthology. Third edition. By L. E. H. WHITBY, C.V.O., M.A., M.D. Camb., F.R.C.P., D.P.H., Bacteriologist, Bland-Sutton Institute of Pathology, Middlesex Hospital. London: J. and A. Churchill. 1938. Pp. 372. 11*s*. 6*d*.

THIS little book is written on orthodox lines, and its popularity with students is no doubt due to the the fact that it covers, without exceeding, the bacteriological knowledge required for qualifying examinations. Within this scope it is serviceable and reliable. It ought to prove particularly useful in helping final-year students to understand the applications of bacteriology to practical medicine. There are a few minor misprints and mistakes which should not be allowed to pass into future editions. The Ziehl-Neelsen stain is described as Ziehl-Neelsen's, hofmannii is indifferently spelt as hofmanni and hofmannii (and in the index as hoffmanni), and in two places *Clostridium botulinum* is referred to as *Cl. botulinus*. The important subject of toxin and antitoxin standardisation is confusingly discussed. If the matter is not properly treated it would be best to leave it alone in elementary works. The usual term for the skin-reacting dose of toxin is *minimum reacting dose* (M.R.D.) not *minimum toxic dose* (p. 221). The author has considerable faith in vaccine therapy and there are a number of pronouncements on this subject in the book that would be considered by more sceptical bacteriologists as over-optimistic; but these small and easily remediable defects do not seriously detract from the value of the book as an introduction to bacteriology.

1937 Year Book of General Medicine

Edited by GEORGE F. DICK, M.D., LAWRASON BROWN, M.D., GEORGE R. MINOT, M.D., S.D., F.R.C.P. (Hon.) Edin., WILLIAM B. CASTLE, M.D., A.M., M.D. (Hon.) Utrecht, WILLIAM D. STROUD, M.D., and GEORGE B. EUSTERMAN, M.D. Chicago: The Year Book Publishers; London: H. K. Lewis and Co. 1937. Pp. 832. 12*s*. 6*d*.

LIKE its predecessors and companions in this admirable series this book summarises a vast number of recently published papers on clinical subjects, perhaps of varying importance and interest to general practitioners but of immense value to specialists. Part I treats of infectious diseases and gives a full account of the therapeutic possibilities of Prontosil and similar drugs. In Part II, on the extracardiac diseases of the thorax, the present position of intensive collapse therapy in tuberculosis is set forth. Part III deals with diseases of the hæmatopoietic system and of the kidney, and Part IV, which is concerned with cardiovascular diseases, includes an account of the at present experimental surgical procedures designed to relieve hypertension. Part V comprises the diseases of the digestive tract and also those of metabolism and nutrition. Here the increasing usefulness of gastroscopy as an aid to diagnosis will be noted. The book is adequately indexed and profusely illustrated with skiagrams, graphs, and microphotographs. As might be expected, the editorial comments which are appended to many of the articles are sound and well balanced. The series to which this book belongs has in a few years won an established place among annual publications.

The Microscope

Theory and Practice. By CONRAD BECK, C.B.E. London: R. and J. Beck. 1938. Pp. 264. 7*s*. 6*d*.

A MICROSCOPICAL image may be misleading if the principles on which the instrument functions are not understood. This book has been written to elucidate these principles, and to provide such instructions as may be needed for the mastery of the technique of microscopy. It is a particularly successful production. The account of optical theory is so clear that anyone who takes the trouble to read it will also understand it, while the practical instructions are concise and informative. The book is obviously written by one with an intimate knowledge of the optical and mechanical construction of a microscope as well as an appreciation of its many applications. It would be difficult to find elsewhere so much practical instruction within the same compass. Mr. Beck has drawn on his long experience of the pitfalls that await the uninitiated with the result that most if not all the possible errors of manipulation are noted. The mechanical construction of a microscope is described in sufficient detail, mainly in reference to the productions of Messrs. R. and J. Beck. This book is actually a new edition of the author's two previous books on the subject. It has gained by the elimination of some unnecessary matter.

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THE LANCET

LONDON: SATURDAY, MARCH 26, 1938

TREATMENT OF THE MALARIAS

THERE is still much confusion of thought about the treatment of malaria, which will only be cleared up when it is realised not only by the expert but by governments, doctors, and peoples that there is not one malaria but several malarias. A study of synthetic drugs, as compared with quinine, in therapeusis and prophylaxis forms the substance of the fourth general report of the Malaria Commission of the League of Nations.[1] A section of the report is devoted to attempts in Rumania, U.S.S.R., and elsewhere to eradicate malaria from a locality, and the disappointing conclusion is reached that this cannot be achieved by drugs alone. Only by using all known anti-malarial means—especially measures directed against the vector insect and against the larvæ—can there be any great hope of attaining a goal which is in any case difficult to reach. The malariologist's programme should be a more modest one: to safeguard the populations of endemic regions, or the communities which have to live and work there, from severe and fatal infections, epidemic outbreaks, repeated reinfection, chronic malarial manifestations, and the social and economic consequences of endemic conditions. Whether the measures adopted to this end are drugs or an anti-mosquito campaign, or a combination of both methods, will depend on the local circumstances, the density of the population, and the economic factors involved.

An important preliminary is to ascertain the different drugs and doses most effective against the different species and strains of plasmodia and the sexual and asexual cycles of the same species, and the report gives definite guidance for doing this. For purposes of comparison the mean daily adult dose of quinine hydrochloride is taken as 1 gramme, of Atebrin as 0·3 gramme, and of Plasmoquine as 0·01 gramme. The reaction of trophozoites to quinine, given daily for 5 to 7 days in primary infections with *Plasmodium vivax*, is seen in their disappearance from the circulating blood till the first relapse comes on, as it does in about half the infected; the same reaction usually holds for *P. malariæ*; for *P. falciparum* the process is slower by about a day and the daily dose needed to effect clearance of the blood may have to be raised to 1·3 g. or 2 g. The action of atebrin on the trophozoites of tertian and quartan malaria is similar to but rather more rapid than that of quinine, and relapse is delayed for rather longer; on those of subtertian malaria this advantage may or may not show itself. The effect of plasmoquine on the trophozoites of *P. falciparum* is almost nothing, on those of *P. vivax* it is evident, while on those of *P. malariæ* it is rather greater. Turning to gametocytes and pregametocytes; quinine and atebrin are deadly to those of the last two species, but they have little effect on crescents though they interfere with their production; on the other hand plasmoquine devitalises gametocytes of all three species and lessens their numbers. For the clinician dealing with an acute malarial attack plasmoquine thus has no direct interest; but it will be in his mind as a means of preventing relapses. When given with or after quinine or atebrin it has a definite action in preventing relapses in infection with *P. malariæ* and in those with most strains of *P. vivax*, though its effect on *P. falciparum* seems less certain. In the armamentarium of the administrator concerned with public health plasmoquine has evidently won an established place.

That treatment for malaria may have ill effects of various kinds has not been forgotten in this survey. The conclusion reached by the Commission is that a strictly limited course of quinine is neither depressive nor toxic, nor does it interfere with the course of immunisation; about atebrin too little is known for opinion to be definite; a short course of plasmoquine in doses up to 0·2 g. is not seriously depressing. The advocacy of these short courses of treatment starts from the assumption that in practice drugs do not disinfest; their use should therefore be limited to keeping the infection under till the body has effected the final cure. This limitation avoids poisoning the host, and leaves him with a degree of infection which, under supervision, should help him to strengthen his resistance to existing and further infections. Since disinfestation is the patient's business, in which the physician's only share at present is the negative one of avoiding any intervention that might hinder him from getting on with it, it is essential that we should try to learn more about the details of the mechanism of immunisation. The considerable work of WILLIAM H. TALIAFERRO and PAUL R. CANNON[2] points to the macrophage of the reticulo-endothelial system as the agent active in the production in Panamanian monkeys of immunity to *P. brasilianum*; but the matter cannot be quite as simple as that, for S. P. JAMES and P. TATE[3] have directed attention to the fact that certain plasmodia of birds have adapted themselves to undergo a schizogonic cycle in the cells of that very system.

The main conclusion to which this report leads is that adequate treatment and accurate prognosis of a malarial attack must be based on knowledge of the species of parasite concerned and on some understanding of its local strain. No generalised advice can be offered to the clinician until the pathologist is able to give him a lead to the conditions in which the human body will best build up an immunity to present and future plasmodial infections.

[1] *Bull. Hlth Org. L.o.N.* 1937, 6, 896.

[2] *J. infect. Dis.* 1936, 59, 72.

[3] *Trans. R. Soc. trop. Med. Hyg.* 1937, 31, 4; cf. *Lancet*, 1937, 2, 1027.

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REASON AND THE ROD

As a penalty inflicted by judges and magistrates, corporal punishment must go. Such is the unanimous opinion of a departmental committee of men and women who have reviewed the matter with patience and without preconceived opinions. The retributive aspect of a *lex talionis* meeting violence with violence is dismissed as a social anachronism. While the committee makes an exception for violence by the inmates of prisons, the birch and the cat-o'-nine-tails are deemed useless as reformative influences and inadequate as special deterrents. Flogging, abandoned by almost all other civilised countries, remains with us as a penalty additional to imprisonment or penal servitude; it is not essential, in the committee's opinion, to retain it for its supposed effect as an additional terror. A prison governor gave evidence of two cases where he had spoken to men who had been flogged for armed robbery. "Next time," said one, "I shall take care not to carry a gun." "Next time," said the other, "I shall take care to use my gun." Neither, be it noted, had any idea of abandoning robbery altogether. Even those who emphasise the deterrent value of corporal punishment claim only that it deters from those special offences for which flogging may be inflicted. Contrary to widely accepted tradition, experts say that the introduction of the lash by the Garrotters Act of 1863 was not the cause of stamping out the prevalent epidemic of brutal crime. By the time the Bill reached the House of Commons the outbreak of garrotting had already subsided. It is untrue that flogging is so efficacious that nobody is ever flogged a second time. Other historic extensions of the use of the lash by panic legislation have been largely retributive. Corporal punishment for sexual perversion or indecent exposure is more likely to be detrimental than remedial. Whatever the offence, this punishment is uncertain and, if the word may be permitted, unfair. It cannot be imposed unless the offender is passed as medically fit to undergo it. As for juvenile delinquents, a brief medical examination may normally suffice to determine the boy's physical fitness for the birch. His psychological and temperamental capacity is much more difficult to assess. The committee had evidence that the usual medical examination had not always prevented the birching of boys suffering from certifiable mental defect. The justices in a juvenile court have not the advantage of that prolonged examination of the boy's case which would equip them with full knowledge of his character and temper, his previous history, and his home life. Corporal punishment should follow closely on the finding of guilt, yet it should not be inflicted without the certainty that the boy is temperamentally suited for it. These two requirements of promptitude and deliberation are incompatible.

Let it not be thought that the committee have been dominated by advanced psychological ideologies. They are aware of the theory that the impulse to impose a sentence of corporal punishment is a perverted expression of the community's hatred of one who breaks its laws. They observe that the full implications of this idea would affect many other forms of punishment. They do not regard all corporal punishment as wrong. They say that the rigours of judicial flogging have often been exaggerated by opponents of the lash. While they deprecate the birching of juvenile delinquents, they find much to be said for a short sharp punishment which pulls a boy up for some act of naughtiness. They doubt if the juvenile court is well enough equipped for dealing effectively with offences which arise from a misguided spirit of adventure. They see no harm in vigorous correction of a domestic kind. They distinguish the corporal punishment inflicted by an unknown official after magisterial sentence from the possibly beneficent equivalent in the home and in the school. The father and the schoolmaster stand in personal relation to the young offender. They will continue to supervise him thereafter. These are definite advantages. In his home the boy realises, or at any rate is probably told, that he is being punished for his good; in the school he appreciates that punishment is part of the accepted discipline. The judicially imposed penalty may easily seem an arbitrary and impersonal infliction of physical pain. Several of the chief constables told the committee that they would prefer the birching to be administered by the schoolmaster or the probation officer rather than by the policeman. However these things may be, the committee's report is a valuable reminder that the merit of modern punishment must be its remedial and reformative effect. Stated without fanaticism or intolerance, its conclusion that the lash and the birch have outlived their day will convince. The recent sentences of the cat in what was known as the Mayfair case were greeted at first with no small measure of public satisfaction. They have now been inflicted and the men concerned are undergoing the accompanying sentences of incarceration. Will the cat have had a remedial effect upon them by the time they leave the prison gates? And is the community proud of its morbid interest in the details of the flogging?

The committee has proved its case so reasonably that the recommended retention of corporal punishment for violent prisoners is almost surprising. The atmosphere of our prisons has been humanised, the archaic severity of punishment has been mitigated, and statistics show that the flogging of a violent prisoner does not always deter him from future violence. Nevertheless the committee prefer that the power to inflict the lash or the birch should be retained as an ultimate sanction to punish the three serious offences of mutiny, incitement to mutiny, and gross assaults upon warders. The report mentions incidentally that, while birching is probably quite as painful as the cat, a prisoner who has been birched tends to be laughed at by his fellows as having received only a boy's punishment, whereas one who has had the cat is apt to be looked up to as a hero. This might suggest that the birch would be the better instrument to retain. It seems however

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that the prison inmate has more fear of the cat. As corporal punishment is to be preserved for the protection of officers who are usually unarmed and for its deterrent effect upon men who are unimpressed by the reformative influence of methods less sharp, the committee recommend that both birch and cat be left available. Other minor recommendations are that the maximum number of 24 strokes be reduced to 18, that an end be put to the queer anomaly whereby a prisoner serving without hard labour can be flogged if his sentence was for felony but not if it was for misdemeanour, that the English and Scottish conditions be assimilated, and that the half-crown award now bestowed on the officer who inflicts the punishment be discontinued. For Borstal institutions in England the committee wishes to abolish the birch. There has never been any power to birch a Borstal boy in Scotland. The rod is not wanted for Borstal discipline; it has almost gone out of use; and exceptional cases can be dealt with by transfer to more rigorous surroundings. It was the general view of visiting justices and boards of visitors that the birch should be kept for these exceptional cases. On the other hand, five of the seven Borstal governors were for abolition. The departmental committee has listened to the governors rather than to the visitors. It may be some time before the Home Office secures statutory realisation of its committee's proposals. The House of Lords has sometimes been an obstinate champion of the sterner traditions of correction.

CHEMOTHERAPY OF MENINGITIS

INVOLVEMENT of the meninges is perhaps the gravest complication which can occur in a bacterial infection, and offers a severe test to any method of treatment. Thus, although the efficacy of serum treatment in some types of pneumonia is now beyond question, there is little evidence that meningitis due to these types of pneumococcus will respond to it. It is therefore highly significant that streptococcal meningitis has been found to share the susceptibility of other forms of streptococcal infection to treatment with Prontosil and sulphanilamide. The uses of this treatment were referred to by T. CAWTHORNE in our issue of Feb. 4th (p. 304) and other reports have recently appeared which are uniformly favourable, although the time has not yet come when results can be collected in large numbers. C. G. FLAKE and B. W. CAREY,[1] for example, treated six cases of otitis media in children, four of which were complicated by meningitis and one by septicæmia; all recovered. J. B. NEAL and E. APPELBAUM[2] used sulphanilamide in the treatment of streptococcal meningitis with results which seemed to them "quite astounding"; thirteen of their seventeen cases recovered. Here again, as would be expected, the majority were in children and due to otitis media. Recovery in such cases has hitherto been most exceptional, and on that account these results are perhaps even more impressive than those obtainable in other varieties of streptococcal infection such as erysipelas and puerperal fever.

The advent of this treatment has also improved the outlook in meningitis due to the meningococcus. The original experiments by BUTTLE, GRAY, and STEPHENSON, and by P. PROOM, in which it was shown that this organism is susceptible to the action of sulphanilamide were reported in this journal,[3] and such reports as have appeared of consequent clinical trials are favourable, although these are so far fewer and less extensive than might have been hoped. F. F. SCHWENTKER, S. GELMAN, and P. H. LONG[4] treated ten cases with only one death, the method of administration being the intrathecal and subcutaneous injection of a 0·8 per cent. solution of sulphanilamide in saline. Dr. A. ELDAHL of Copenhagen, who describes his results on p. 712, has treated twelve cases with nine recoveries; since most of these were infants, in whom the mortality is usually high, these are favourable results. In neither of these two series of cases was any serum given. Antimeningococcal serum is a far from perfect remedy, but those who are reluctant to omit any form of treatment which might possibly be of help will doubtless continue to give serum in addition to chemotherapy, and they have the support of T. M. BROWN,[5] who finds this combined treatment experimentally more effective than either alone.

It cannot be said that an optimum scheme of chemotherapeutic dosage has yet been defined, and a good deal of variation in method will be found in the papers quoted. Further trials should be guided by the following principles. It appears that sulphanilamide itself is the most effective drug, although soluble prontosil may take its place if parenteral injection has to be carried out owing to vomiting or other difficulties connected with oral administration. Other sulphonamide compounds about the action of which less is known, particularly in connexion with the meningococcus, are as yet of correspondingly uncertain value. The aim in dosage should be to attain an adequate concentration in the blood as early as possible, and to maintain this by four-hourly repetition until improvement occurs. According to A. JAUERNECK and W. GUEFFROY[6] sulphanilamide reaches the cerebro-spinal fluid, though after varying intervals of time, in greater concentration when there is meningitis; their findings in its absence are in conflict with those of MARSHALL, EMERSON, and CUTTING,[7] who noted that the concentration attained in the cerebro-spinal fluid of the normal dog was about three-quarters of that in the blood. Some of the authors quoted emphatically recommend intrathecal administration, and others consider it unnecessary. Those who have used it maintain that the intrathecal injection of a 0·8 per cent. solution of sulphanilamide in saline is a harmless procedure, and since by this means an

[1] *New Engl. J. Med.* 1937, 217, 1033.
[2] *Amer. J. med. Sci.* February, 1938, p. 175.
[3] *Lancet*, 1936, 1, 1286; 1937, 1, 16.
[4] *J. Amer. med. Ass.* 1937, 108, 1407.
[5] *Bull. Johns Hopk. Hosp.* 1937, 61, 272.
[6] *Klin. Wschr.* 1937, 16, 1544.
[7] *J. Amer. med. Ass.* 1937, 108, 953.

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adequate concentration of the drug can certainly be attained at the site of the disease earlier at least by some hours than by any other means, it should be a valuable measure at the outset, pending the effects of oral administration. Further studies of the rapidity and extent of sulphanilamide secretion into the cerebro-spinal fluid seem to be required.

HÆMORRHAGE, JAUNDICE, AND VITAMIN K

ACCORDING to the theory of blood coagulation most widely held at the present time, a ferment-like substance prothrombin is converted into thrombin in the presence of calcium and tissue derivatives. The thrombin then reacts with the fibrinogen of the plasma to produce fibrin.[1] There is no simple selective method for the estimation of prothrombin and the technique described on another page by DAM and GLAVIND, like most of its predecessors, measures the time not only for the conversion of prothrombin into thrombin but also for the reaction of thrombin with fibrinogen. The test devised by DAM and GLAVIND nevertheless agrees with that of QUICK and his co-workers[2] in giving normal values in hæmophilia and much reduced values in spontaneous jaundice in man. The level of prothrombin falls in the plasma of animals with a complete biliary fistula and therefore one factor for its maintenance is the presence of bile in the bowel.[3] But obstruction to the outflow of bile is not the only explanation of the hæmorrhagic tendency of jaundice, for it occurs also in chloroform poisoning and in animals who are fed on toxic sweet clover hay, suggesting that the liver is actively concerned in the manufacture of prothrombin and that toxic factors can deplete the supply.[4]

A rational explanation for the hæmorrhagic tendency of jaundice and a method apparently satisfactory for its treatment are now available as a result of the experimental work of DAM and his collaborators. For some years they have been studying a hæmorrhagic state which develops in certain birds when they are fed on a defective diet and is associated with a deficiency of prothrombin in the plasma. Hæmorrhagic chick disease is characterised by a pronounced tendency to hæmorrhage and a reduced clotting power of the blood, and it appears to be due to the absence of a fat-soluble food constituent which has been called the *Koagulationsvitamin* or vitamin K. This vitamin is especially abundant in hog-liver fat and in green leaves; it can be prepared in the form of strong concentrates, the intramuscular or intravenous injection of which, in jaundice, brings back to normal the coagulating power of the blood. It would therefore appear that the absorption of the fat-soluble vitamin K is decreased in jaundice as a result of the steatorrhœa and the hæmorrhagic tendency may be regarded as a conditioned deficiency. Direct deficiency of vitamin K can be produced only with difficulty, if at all, in mammals.

DAM'S work is confirmed in a symposium of papers from the Mayo Clinic[5] and the various studies made suggest that bleeding in jaundice occurs when the level of prothrombin reaches as low a point as 20 per cent. of the normal amount. This point is a critical one; the transition from apparent normality to a hæmorrhagic state may be abrupt and may follow quite a small operative blood loss, owing to the body's inability to regenerate prothrombin in the absence of vitamin K. The vitamin is ineffective by mouth in jaundice, unless bile is administered at the same time; otherwise it is not absorbed. The combination of vitamin K and human bile or animal bile salts has been used with apparent success in eighteen patients with obstructive jaundice. ALMQUIST[6] in California has now obtained the anti-hæmorrhagic substance in the form of a colourless crystalline fraction and has demonstrated that it contains the benzene ring. Surgeons need anticipate no great delay before the formula is known and pure preparations are available for parenteral use.

NEW FELLOWS OF THE ROYAL SOCIETY

THE endorsement by the Royal Society of the recommendations made by its council for election to the fellowship has this year been advanced from May to March, and the official list of names is set out on another page. Whereas last year only one medical man received this coveted honour, this year we have to welcome three members of our profession as well as others whose work is directly concerned with medical problems. C. H. BEST was associated with BANTING in the discovery of insulin and has not only contributed largely to our knowledge of its effects but has also helped to devise methods for its large-scale production. Recently his work has thrown light on the rôle of choline in the metabolism of fat and carbohydrates. W. E. GYE was led by his work on the defence rupture mechanism after the war to productive experimental study of the pathology of silicosis. Since 1925 he has concentrated attention on the problems of malignancy and his studies of the agency of viruses in the ætiology of new growths have given a fresh stimulus to the study of cancer throughout the world. H. H. WOOLLARD has done distinguished work especially in neuroanatomy. His recent contributions of clinical interest have been in the distribution of the sensory endings in the human skin, on tests for visual perception, and on the lymphatic system as revealed by opaque injections. Of the scientists doing work with a direct bearing on medicine, J. W. COOK has discovered the relation between the chemical structure and the carcinogenic activity of certain complex hydrocarbons and has contributed to our knowledge of the structure and properties of sex hormones. EDGAR STEDMAN has explored the relation between chemical constitution and physiological action in alkaloids of the urethane group.

[1] Eagle, H., *Medicine, Baltimore*, 1937, 16, 95.
[2] Quick, A. J., Stanley-Brown, M., and Bancroft, F. W., *Amer. J. med. Sci.* 1935, 190, 501.
[3] Hawkins, W. B., Brinkhous, K. M., *J. exp. Med.* 1936, 63, 795.
[4] Roderick, L. M., *Amer. J. Physiol.* 1931, 96, 413.
[5] *Proc. Mayo Clin.* Feb. 2nd, 1938.
[6] Almquist, H. J., *J. biol. Chem.* 1937, 120, 635.

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ANNOTATIONS

COMMISSIONS IN THE R.A.M.C.

WE learn that the supply of medical officers for the regular army is now being maintained at a rate which should soon make up the shortage experienced for some years after the war. Since 1934, when the recommendations of the Warren Fisher Committee were adopted, 195 short-service commissions have been given. Of this number 182 qualified in home medical schools and 13 in the Dominions. Resident civil hospital appointments were held by 152 officers before or after receiving a commission. This high proportion is the result of seconding young officers to complete or to take up house appointments after being gazetted into the Royal Army Medical Corps. Since 1935 junior officers with special qualifications or who have experience beyond the average in particular branches of medicine may be "graded" for special employment in the subject of their choice and while so employed receive additional pay. Up to date 49 have been graded as follows: surgeons 19, anæsthetists 10, gynæcologists 6, physicians 5, pathologists 3, otologists 2, ophthalmologists 2, dermatologists 2. The next entry for the corps takes place on May 1st.

SIX YEARS WASTED

THE appointment of the Interdepartmental Committee on the Nursing Services has led to a revival of interest in the final report of THE LANCET Commission on Nursing. Now that many bodies deeply concerned at the shortage are preparing evidence for submission to the committee we receive almost daily tributes, direct and indirect, to the wisdom of the proposals made therein. The consensus of opinion is that if these had been more generally implemented the supply of candidates would by now have been adequate to the increasing need. This view was set out with cogency and precision in a contemporary [1] last week.

"The standard work on reform of the nursing profession is THE LANCET Commission's report (1932), a work of such excellence that though it is somewhat old it will never become obsolete. Had THE LANCET recommendations been adopted in full, the nursing profession would have been placed on a basis from which it would have developed automatically and the necessity for the Interdepartmental Committee would not have arisen. The College of Nursing memorandum * says: 'The recommendations put forward by THE LANCET Commission became unnecessary as the position was remedied automatically by the economic world crisis.' We are inclined to put this somewhat differently by saying that the crisis in relieving by force of circumstance the acute shortage of nurses which led to THE LANCET Commission, gave a temporary excuse for not accepting its recommendations. The crisis fortunately has passed and the troubles of the nursing profession have returned and some permanent settlement of them is now imperative."

Our contemporary proceeds to comment on the training of a health visitor and to protest against one of the suggestions made by the College of Nursing in their evidence—that the health visitor's two years' training might be taken as a pre-nursing course to fill the gap between school and hospital. Medical officers of health give good reasons for objecting to this sequence of professional education. They contend that the special kind of training required by the health visitor cannot be appreciated by those without considerable experience of life and would only be confusing to a young girl who knows nothing of the social troubles of humanity and how to react to them. It would indeed be small gain if the gap were filled at the expense of the balanced outlook which is more essential than ever before in those who go into the homes of the people to teach them the art of healthy living.

[1] *Med. Offr.*, March 19th, 1938, p. 116.

* Memorandum relating to conditions in the nursing profession for submission to the Interdepartmental Committee on the Nursing Services. 1938. Pp. 43. 1s. 6d. (Obtainable from the Secretary of the College, 1a, Henrietta-street, London, W.1.)

FIBIGER'S TUMOUR OF THE RAT'S STOMACH

THE significance of Fibiger's contribution to the cancer problem [1] is generally held to lie in his demonstration of an extraneous cause, the parasitic worm *Gongylonema neoplasticum*, in the stomachs of rats affected with gastric cancer, and in the provision of an experimental method for reproducing this lesion by feeding rats with that parasite. The history of his discovery and the difficulties which he met with and overcame are related by Hadfield and Garrod [2] who describe it as one of the most extraordinary stories in the whole of pathology. Another chapter in this story has lately been added by Cramer.[3] From it we realise that the mystery deepens while the interest it evokes becomes in some ways greater, in others less. It is less because doubt has arisen whether Fibiger's tumours were in fact malignant carcinomata. The question was first raised by Bullock and Rohdenburg [4] and more recently by Passey [5] and, as Cramer points out, the only conclusive evidence to be found in support of malignant change refers to one mouse from which Fibiger succeeded in transplanting one of his alleged carcinomata through four generations. The lesions in the lungs described as metastases may very well have been squamous metaplasia of bronchial mucosa due, as Passey, Leese, and Knox [6] have pointed out, to a diet deficient in vitamin A. Fibiger repeatedly stated in his writings that his animals were kept on a diet composed exclusively of white bread and water. This would have contained little or no vitamin A and a subsidiary problem, which Cramer discusses, is how these rats managed to live long enough to get the lesion. In interpreting Fibiger's accounts of the tumours, however, it has to be remembered that he clearly described two distinctive conditions, a benign hyperplasia and a malignant type of growth, and that he was an experienced observer. It might then seem to be a simple matter to settle this doubt by repeating Fibiger's experiments. It appears that no one has attempted this with mice, and that Passey has been unable to obtain any but benign lesions in rats, although he fed his animals with the *Gongylonema neoplasticum* in combination with a diet of white bread and water, and with a vitamin-A deficient diet. Even so the benign lesions he obtained were slight and not

[1] Fibiger, J., *Z. Krebsforsch.* 1913, 13, 217; 1914, 14, 295; 1920, 17, 1.

[2] Hadfield, G., and Garrod, L. P., Recent Advances in Pathology, London, 1934, p. 55.

[3] Cramer, W., *Amer. J. Cancer*, 1937, 31, 537.

[4] Bullock, F. D., and Rohdenburg, G. L., *J. Cancer Res.* 1918, 3, 227.

[5] Passey, R. D., Annual Report of the Yorkshire Council of British Empire Cancer Campaign, 1934, p. 9; 1935, p. 8.

[6] Passey, R. D., Leese, A., and Knox, J. C., *J. Path. Bact.* 1936, 42, 425.

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comparable with Fibiger's or Cramer's benign hyperplasia.

The added interest arises from Cramer's own experiences. Various claims had been made that extensive benign hyperplasia and even carcinomata could be produced in the rat's fore-stomach by dietetic deficiencies alone. In 1927 Cramer sought to test these claims and though he was able to obtain all degrees from a few papillomata to extensive hyperplasia filling the whole fore-stomach he found that they occurred in rats deficient in vitamin A, in others partially deficient in vitamin B, in others on an abnormal salt diet, in stock rats which had never suffered any known deficiency and also in rats fed on kitchen scraps. Of the lesions he got at that time he has complete histological and photographic records. Although extensive hyperplasias were often seen, no malignant lesion was ever obtained. Ten years later the investigation was restarted in order to find out if by superimposing a carcinogenic substance on a benign hyperplasia due to the dietetic deficiency, malignant change could be induced. On this occasion, however, the same diets, that is to say synthetic diets deficient in vitamin A or B, which had previously produced papillomatosis, failed completely to induce this condition. All other diets alleged to produce papillomatous hyperplasia also failed, and no example of the lesion was found among untreated stock rats. Thus any progress in elucidating this problem appears at the present time to be obstructed because neither condition described by Fibiger can be produced at will.

For two good reasons, to which Cramer draws attention, all the discrepancies which he relates require publicity among laboratory workers. In the first place they must be taken into account in experiments designed to test the carcinogenic action of substances, especially those in food and drink. Simultaneous control observations of normal stock are shown to be indispensable. In the second place it now appears that some unknown factor may be the determining one in the onset of benign and malignant hyperplasia of the rat's stomach, while both *Gongylonema neoplasticum* and dietetic measures may be merely contributory. If this is so it is a possibility that the cause of either or both lesions is a virus similar to that responsible for the infective papilloma of the skin of rabbits. The appearance at one time and disappearance at another under apparently similar conditions offers a pointer in that direction for the next observer who comes across this lesion.

J. NEUROPHYSIOL.

A NEW scientific periodical, the *Journal of Neurophysiology*, was launched from Yale University last January. The editors are J. G. Dusser de Barenne and J. F. Fulton (Yale) and R. W. Gerard (Chicago) acting with an advisory board of 25 distinguished neurophysiologists drawn from both sides of the Atlantic, including Prof. E. R. Adrian and Sir Charles Sherrington in this country and Dr. J. C. Eccles in Sydney. An editorial memorandum states that the primary aim of the journal is "to provide a channel for *prompt* publication of original work bearing on the functions of the nervous system, peripheral and central. It has been planned to embrace all aspects of the subject amenable to experimental analysis; it will not include morphology for its own sake nor neuropathology, and only those clinical, psychological, or zoological contributions will be considered which are primarily experimental in character." The editors point out, and most will agree with them, that, apart from the claims of neurophysiology to independent recognition, there is an urgent practical need for a new channel of publication. It is indeed true that many neurophysiologists at present find their outlet for publication in journals such as *Brain* in this country and the *Archives of Neurology and Psychiatry* in America, but these already have to meet the heavy claims of neuropathology and clinical neurology. This new journal, then, fills a need and may indeed, as the editors hope, serve not only to concentrate divergent experimental investigations on the nervous system but also to relieve congestion in neurological publications of more general scope.

The first number includes nine papers on subjects ranging from the potassium content of nerves as affected by stimulation, to electrical studies of nervous tissue and ablation experiments in cats and monkeys. The journal is of standard form, printed upon glossy paper which permits the inclusion of photographs and line drawings in the text. An auspicious start has been made, and support for the venture will doubtless be forthcoming from this country, which has supplied many brilliant workers in this particular field.

CARDIAC FAILURE

WHY does the patient with old-standing symptomless aortic regurgitation suddenly develop failure symptoms, when it is known that the valvular lesion has undergone no change for many years? This is the poser put to the February meeting of the Liverpool Medical Institution by Dr. G. R. Ellis. His own view is that changes in the myocardium rarely provide a satisfactory explanation except where massive infarction or some such lesion has occurred, and that the answer probably lies in some metabolic change in the myocardium, akin to fatigue in skeletal muscle. This concept is one which should stimulate research in the next few years. Work on the biochemical aspect of cardiac failure was and is held up by the lack of knowledge of what happens to the metabolism of a muscle when it becomes fatigued. The Starling heart-lung preparation has shown that as the heart fails its mechanical efficiency decreases, so that in order to maintain the same output more energy must be expended. Most modern theories of the cause of cardiac failure suggest the importance of a diminished utilisation of oxygen in the metabolism of the failing muscle. Fishberg,[1] in the book reviewed elsewhere in this issue, summarises the reasons for believing that even in the absence of coronary disease there may be a deficient supply of oxygen to the muscle of the hypertrophied heart. The occasional failure of the heart in cases of severe anæmia may be due directly to the diminished supply of oxygen, since the failure disappears with the cure of the anæmia. It has been suggested that angina pectoris may have the same causation, in which case it will have to be explained why angina does not occur more commonly in cardiac failure.

From time to time chemical changes thought to be associated with fatigue in skeletal muscle have also been shown in failing heart muscle. Redfield in 1926 showed that the ability of the ventricular muscle of the turtle to develop tension is closely correlated with its content of lactic acid, so that the more lactic acid present the less tension can be developed. Harrison[2] found that in skeletal muscles overwork was associated with a decrease in the potassium content and has shown that in the muscle

[1] Fishberg, A. M., Heart Failure, London, 1937.
[2] Harrison, Pilcher, and Ewing, *J. clin. Invest.* 1930, 8, 325.

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of the failing heart the potassium content is also low. A large portion of the energy for contraction of skeletal muscle is derived from the breakdown of creatine-phosphate, and G. Herrmann [3] has produced evidence that the creatine content is less than normal in muscle taken from human cases of heart failure and has found similar results in experimental animals. It is suggested that these changes are due to diminished oxidation, but practically nothing is known of their intimate nature.

Of the general metabolic disorders causing cardiac failure, myxœdema, hyperthyroidism, and beri-beri seem most suitable for study. Cardiac failure is rare in myxœdema, possibly because the lowered metabolism decreases the work of the heart, and when it does occur pre-senile coronary disease is said to be present. In hyperthyroidism the work of the heart at rest is increased and the position is analogous to that in valvular disease, with the added factor that the thyroid may stimulate increased metabolism in the heart muscle itself. It may be that in beri-beri an altered metabolism of the heart muscle is responsible for the onset of cardiac failure. Human subjects and rats on a diet deficient in vitamin B_1 have developed cardiac failure and changes in the electrocardiogram which could be restored to normal by adding vitamin B_1 to the diet. Wenckebach [4] suggested that œdema of the heart muscle was the cause of its failure, but such œdema is not invariably present in beri-beri, and the B_1 deficiency may act by depressing some oxydase system in the metabolism of cardiac muscle. The beri-beri heart is well worthy of further study because it appears to present an instance of cardiac failure in the absence of mechanical factors and its cause and cure are known.

VALUE OF A CORNEO-SCLERAL SUTURE IN CATARACT EXTRACTION

DAMAGE to the eye during operations for cataract through failure of coöperation on the part of the patient or his misbehaviour during operation is one of the most distressing of avoidable accidents, and most recent advances in the surgery of cataract extraction have been concerned with measures for preventing such mishaps. Akinesia of the orbicularis oculi, retro-ocular anæsthesia, a speculum that does not press or weigh upon the eye, and a superior rectus stitch are among the more important of these technical additions to the classical operation. Although many surgeons in different countries have used some method of suturing either the conjunctival flap or the cornea and sclera in cataract extraction, the value of a corneo-scleral stitch has not been widely appreciated by ophthalmologists. H. B. Stallard [5] in a series of 95 cases of cataract extraction (72 extra- and 23 intra-capsular) has shown that a corneo-scleral suture properly applied is an important factor in the prevention of post-operative hyphæma. Before he used this stitch 30–35 per cent. of his patients at Moorfields developed post-operative hyphæma of varying degree, but since he made it part of his routine this complication has not occurred once in the series of 95 consecutive and unselected cases. Other advantages it brings include a measure of safety in allowing elderly patients out of bed on the day after operation; a reduction of the liability to iris prolapse; and a means of checking vitreous loss, conjunctival sutures being quite useless when this disaster occurs. B. Graves [6] has pointed out that the eyeball may be fixed by holding the scleral ends of the suture in plane forceps, a technical point of some value when the fixation forceps tear through a thin degenerative, senile conjunctiva. Stallard has devised for the insertion of this stitch a small eyeless curved needle 11 mm. long, with a cutting spine on the convex aspect of the needle; this needle seems to have definite advantages over the Maddox needles hitherto used for this purpose, for they not only have a spine on the concave aspect of the needle shaft and are thus liable to cut out of the cornea, but also an eye which means that a double piece of fine silk has to be dragged through the tissues.

WAVE-LENGTH AS A FACTOR IN RADIOTHERAPY

AT a time when large sums are being spent on the purchase of radium and on the building of high voltage X ray therapy apparatus, it is opportune to ask whether a real gain in efficiency results from using rays of shorter wave-length. The question is discussed by Mr. G. F. Stebbing,[7] who points out that the major advantages which may be expected are greater penetrating power and a more selective action. The penetrating power of short-wave radiation is a physical fact and it is clear that increase of penetration must give a better dose at a depth in proportion to the dose received at the skin, but that short waves have a selective action is not yet accepted as a biological fact. Mr. Stebbing holds the view that gamma rays show clinically a selective effect which is not a property of wave-lengths in the ordinary X ray therapy range. Particularly in the treatment of malignant diseases in the posterior part of the oral cavity and in the pharynx he has found them more destructive to the tumour and less injurious to the surrounding normal tissues. On the other hand, in Mr. Stebbing's experience, short waves have an unfortunate selective effect on the blood-cells, and the treatment of large masses with penetrating radiation requires extreme care because of the risk of a dangerous leucopenia. His plea for further research on these controversial points will be endorsed by all who have the heavy responsibility of determining the type of radiation most appropriate to individual malignant lesions.

THE WEIL-FELIX REACTION AND PROTEUS BACILLI

WHY is it that, in contrast to human beings, monkeys, dogs, cats, and rats, the guinea-pig when infected with typhus virus does not give a positive Weil-Felix reaction? This is the question asked by P. Giroud and S. Tannenbaum,[8] who attempt to provide an answer to it. They believe that the guinea-pig is peculiar in that it contains no proteus bacilli in its intestine. Frequent observations entirely failed to reveal the presence of these organisms in either the blood or the fæces. Attempts were therefore made to implant it in the intestine, and to study the result in terms of the development of agglutinins to proteus X. One group of guinea-pigs was infected with typhus virus; their blood, as was to be expected, remained persistently free from agglutinins to proteus (O)X19, (O)X2, (O)XK, and (O)XL. Another group received a strain of *Bact. coli* by the mouth and by the rectum over a period of 23 days; these animals

[3] Herrmann, Decherd, and Schwab, *Sth. med. J., Nashville*, 1936, 29, 386.
[4] Alsmeer and Wenckebach, *Wien. Arch. inn. Med.* 1929, 16, 193.
[5] *Post-Grad. med. J.* February, 1938, p. 49.
[6] *Brit. med. J.* 1937, 2, 319.
[7] *Brit. J. Rad.* March, 1937, p. 177.
[8] *Arch. Inst. Pasteur, Tunis*, 1937, 26, 671.

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did not develop a Weil-Felix reaction. A third group received a strain of proteus, labelled M, by the mouth and rectum for 23 days, and likewise remained negative. A fourth group, which had been given proteus, strain M, and had then been infected with typhus virus, developed agglutinins after two or three weeks to (O)X19 and (O)XL in a titre varying from 1/25 to 1/1000, though not to (O)X2 or (O)XK; while another group that had been given proteus, strain Melun, by the mouth and had then been infected with typhus virus, agglutinated (O)XL, but not (O)X19, (O)X2, or (O)XK, to a titre of 1/100 or over. Not every animal in these last two groups reacted, but most of them did. Discussing these findings the authors conclude that a Weil-Felix reaction will not develop unless proteus bacilli are present in the intestine. Why it is that agglutinins develop to organisms of the proteus X group during the course of typhus fever is, however, not very clear. It is known that *Rickettsia prowazeki* and proteus X share a common antigen, and many workers have therefore assumed that the Weil-Felix reaction is due to the simple development of agglutinins to this antigen as the result of infection with the typhus virus. If this were so, it is difficult to understand why the serum of the guinea-pig, which develops protective antibodies to the typhus virus, should not agglutinate proteus X. It also leaves unexplained the finding that proteus X is not infrequently present in the urine or blood of typhus fever patients. Giroud and Tannenbaum, on the basis of their observations, believe that during the course of typhus fever proteus bacilli, which are normally harmless, become mildly pathogenic, invade the tissues, and give rise to agglutinins acting on one or other of the proteus X strains. They support this conclusion by referring to the occasional development in patients suffering from typhoid fever of agglutinins to *Bact. coli* or *Ps. pyocyanea*. If this explanation is true, it follows that unless proteus bacilli are present in the intestine, a Weil-Felix reaction cannot develop during the course of typhus fever. One of the difficulties in accepting it is in believing that proteus bacilli are never present in the intestine of the guinea-pig but are present uniformly in the intestine of man and several other animals which are susceptible to typhus fever. Is this really true? The question is crucial, and seems to call for a careful survey of the intestinal flora of mammals.

CHIROPODY HAS A JUBILEE

IT was in 1912 that the Society of Chiropodists was founded and three years later saw the young society established and incorporated. The regular annual convention, held in London last week, enlarged its scope to a jubilee celebration; the usual demonstrations at the London Foot Hospital were supplemented by several informative lectures, the exhibition of medical films, and visits to the Guildhall and the Apothecaries Hall. At the jubilee dinner on Saturday evening Mr. J. H. Hanby, who presided, was supported by the society's two founders, Mr. E. G. V. Runting and the veteran Dr. A. W. Oxford, about whom Dr. J. M. H. Macleod had something to say when proposing a toast: "I was walking up Regent-street in 1913 with Dr. Oxford when he remarked to me, 'I have got a new interest in life and I shall not be happy until the benefits of chiropody are brought within the reach of everyone.'" During this short walk Dr. Macleod was invited to give the inaugural lecture to the new society, and from this beginning arose the organisation which has become one of the ancillary services of medicine. The founders laid stress on the need both for training and for an ethical standard, with the result that the curriculum was now approved by the Conjoint Board and Dr. Macleod foresaw recognition being granted by the British Medical Association at its next annual meeting. Dr. Oxford then himself recited the story of the early struggles of the society and consoled its members and fellows for the non-appearance as yet of their names in the honours list by remarking that only two dentists had ever been knighted. He enjoined chiropodists to be loyal one to another and to hold together firmly. Mr. Runting also counselled his hearers, as he said he had often done before, to make themselves so skilled in their craft that the medical profession could do no other than hand over to them cases needing care of this kind. He lost no opportunity himself of emphasising the value of "straight" chiropody. And the harmony was rendered complete by Sir Cuthbert Wallace's reply to the toast of the medical profession. Medicine is, he said, a large family with many concerns and we are glad that chiropodists have joined the family party. There were nearly 300 people present at this banquet.

TRAFFIC IN DANGEROUS DRUGS

THE council of the League of Nations has invited Greece and Czechoslovakia to appoint representatives on the advisory committee on traffic in opium and other dangerous drugs. The retirement of Mr. Lyall (United Kingdom), who has for many years rendered valuable service to the committee as assessor, was regretted and the appointment of a successor was postponed. The council expressed gratification at learning from the Permanent Central Opium Board that compliance with the Limitation Convention of 1931 in regard to furnishing statistics of estimates of drugs required by the several governments was increasingly satisfactory. The completed returns for the year 1936 show that the total seizures of drugs in illicit traffic were of raw opium 142,840 kg., of morphine 513 kg., of heroin 1279 kg., and of cocaine 447 kg. The highest figures for morphine and heroin were from China and for cocaine from Japan. A seizure of 45 kg. of opium and 14 kg. of cocaine was reported from Canada, the drugs having been stolen from a warehouse in Montreal. The burglars had dug into a vault on the premises and, having possessed themselves of the narcotics, proceeded to peddle them in the underworld of Montreal. Some of the cocaine however was conveyed to New York and was there discovered by the police; a gang of seven traffickers was exposed and convicted.

THE SERVICES

COMMISSIONS IN THE R.A.M.C.

APPLICATIONS for commissions in the R.A.M.C. are invited by the War Office. Candidates who will be selected without competitive examination will be required to present themselves in London for physical examination and interview on or about April 22nd. They must be registered under the Medical Acts and (normally) not over 28. Successful candidates will, in the first instance, be given short-service commissions for five years. During the fourth year of this period they will have the opportunity of applying for permanent commissions in either the R.A.M.C. or the I.M.S. Those not selected will retire on completion of five years' service with a gratuity of £1000. Full particulars on application, either by letter or in person, to the assistant director-general, Army Medical Services, War Office, London, S.W.1.

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SPECIAL ARTICLES

BOVINE PHTHISIS

ITS INCIDENCE IN NORTH-EAST SCOTLAND

COUNTY AND CITY CASES

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IN a previous article (1935) we reported the results of typing the tubercle bacilli in the sputum of 103 cases of pulmonary tuberculosis from the country districts of north-east Scotland. The proportion of bovine to human infections—namely, 13 bovine to 90 human—in this series was more than two and a half times as high as that found in the middle east and south of Scotland. Moreover, all the bovine cases were derived from the counties of Aberdeenshire, Banffshire, and Morayshire, giving for these counties the astonishingly high percentages of 15, 18, and 25 respectively. Since bovine cases are apt to appear irregularly in a series we thought that these high percentages might be in part fortuitous and due to chance grouping of cases which owed their origin to infections acquired in different years. We decided therefore to pursue our investigations over a longer period, and to extend them to the city of Aberdeen, in order to arrive at as close an approximation as possible to the true incidence of bovine pulmonary tuberculosis in this region.

The investigation of sputum from the counties was begun towards the end of April, 1934, and from the city of Aberdeen in February, 1935. The total number of cases from north-east Scotland examined down to September, 1937, is 636—342 from the counties and 294 from Aberdeen. Included in the figure 342 for the counties are the 103 cases previously reported and 5 cases from Caithness (1 due to bovine and 4 to human bacilli) examined in 1935 by Dr. W. T. Munro, who has kindly allowed us to include them in our series.

METHODS AND RESULTS

The microscopical examinations of sputum for tubercle bacilli for the whole of north-east Scotland, including the Orkney and Shetland Islands, are undertaken at the laboratory of the City Hospital, Aberdeen. During the periods covered by this inquiry all the positive specimens from the counties and city of Aberdeen have been sent to the Field Laboratories, Cambridge, where the tubercle bacilli were cultivated and typed by one of us (A. S. G.). The methods of isolating and typing the strains have been described in our previous report (1935). The total number of cases which have yielded cultures of tubercle bacilli is 636, in all of which, with one exception, the cultures were obtained directly from the sputum. In 4 cases the sputum though microscopically positive gave negative results in culture and repeat specimens from 2 were also negative.

It has been possible without any difficulty to classify all the strains in one or other of three groups —namely, eugonic human, dysgonic human, and dysgonic bovine.

From 570 cases the strains produced on egg, glycerin egg, and glycerinated potato the luxuriant growths of the eugonic human type of bacillus.

From 22 cases the strains, though growing well on egg, glycerin egg, and bovine serum with formation of pigment on the latter, were dysgonic on glycerinated potato and agar. The virulence of the strains was that of the eugonic human type of bacillus —namely, high for the guinea-pig and relatively low for the rabbit. These are the characteristics of the "dysgonic" variety of the human type.

From 44 cases the strains were dysgonic on all media and proved highly virulent for rabbits. These strains were indistinguishable from tubercle bacilli of bovine tuberculosis.

In this paper we deal fully only with the cases that yielded bovine tubercle bacilli.

TABLE I—REGIONAL DISTRIBUTION OF THE BOVINE CASES

County.	Cases.	Eugonic human.	Dysgonic human.	Bovine and per cent.
Aberdeenshire ..	139	116	11	12 (8·6)
Banffshire ..	69	60	1	8 (11·6)
Morayshire ..	40	35	..	5 (12·5)
Kincardineshire ..	25	25	..	..
Caithness	15	12	1	2 (13·3)
Sutherland ..	2	2	..	..
Invernessshire ..	2	2	..	..
Nairnshire ..	3	3	..	..
Orkneys	13	7	2	4 (30·8)
Shetlands	34	34	..	..
	342	296	15	31 (9·1)
City of Aberdeen ..	294	274	7	13 (4·4)
Total ..	636	570	22	44 (6·9)

THE BOVINE CASES

On account of the possibility of the sputum being contaminated with bovine tubercle bacilli from milk or milk products it is desirable when bovine bacilli are found in sputum to repeat the investigation with a fresh specimen from the patient. In this series we were able to investigate an additional specimen in each of 35 cases, and from 3 of these cases five (one, two, and two) further specimens were examined. The intervals between the first and last specimens from the different cases ranged from 7 to 168 days. In the remaining 9 cases a further specimen was unobtainable owing to the death of the patient before the type of bacillus had been ascertained. It may be mentioned that a request for a further specimen was made at once when on microscopical examination of the original sputum at Cambridge the appearances of the tubercle bacilli suggested that they might be bovine—that is to say, when the bacilli were mainly short and uniformly stained, or when the primary cultures plainly indicated that the bacilli were of the bovine type.

Thus the total number of strains obtained from the 44 bovine cases was 84, all of which were typically bovine in cultural characteristics, none showing any sign of the presence in them of a eugonic human element.

The virulence of the strains was tested on 105 rabbits, 47 strains from 37 cases by intravenous, and 48 strains from 39 cases by subcutaneous inoculation.

Fifty-two rabbits were injected intravenously with 0·01 mg. of culture or less (47 strains from 37 cases), the doses ranging down to a millionth

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TABLE II—GIVING SEX, AGE, OCCUPATION, AND CHIEF CLINICAL PARTICULARS OF EACH BOVINE CASE

Case No.	Sex and age.	Occupation.	Previous glandular tuberculosis.	Clinical duration of pulmonary tuberculosis.	Distribution of tuberculosis.	Family history.
			COUNTY CASES			
S. 2 5.v.34	M., 23	Clerk.	Cervical adenitis at 9 yrs.	2½ yrs.	L. apex.	None.
S. 3 14.vi.34	F., 17	At home.	None.	A few mths.	R. middle lobe and hilum.	Mother cured.
C.S. 9 17.v.34	F., 24	Clerk.	None.	About 4½ yrs.	Bilateral apical, cavitation R.	Yes.*
C.S. 19 1.vi.34	F., 20	Occasional farm-worker.	Cervical adenitis at 7–8 yrs.	4 yrs.	Bilateral fibrotic.	None.
C.S. 26 23.vi.34	F., 27	Domestic worker.	Abdominal glandular at 20 yrs.	5 „	R. lung. No cavities.	None.
C.S. 28 23.vi.34	F., 39	Housewife.	None.	4½ „	L. upper and middle lobes.	Yes.
C.S. 37 7.vii.34	F., 35	Housewife.	None.	1½ yrs. Died 26.vii.34.	Widespread in lungs, L. worst.	Husband.
C.S. 40 9.vii.34	F., 23	Seam-stress.	None.	3 mths.	L. apex.	None.
C.S. 45 19.vii.34	F., 31	Domestic worker.	None.	7 yrs.	Started L. apex, both lungs in 1933; larynx affected.	None.
C.S. 80 26.x.34	M., 36	Trawler fireman.	Neck gl. enlg. and scraped in childhood.	Not fixed, never robust. Died 29.xii.34.	L. lung.	Parents' relatives.
C.S. 94 6.xii.34	F., 21½	Domestic worker.	Cervical adenitis at 16 yrs.	Pleurisy a year ago.	L. apex chiefly.	None.
C.S. 102 4.i.35	M., 28	Grocer's assistant.	None.	6 mths.	Both lungs.	Father's brother.
C.S. 103 8.ii.35	F., 41	Housewife.	None.	9 yrs.	Bilateral.	None.
(Munro's) v.35	F., 65	On a croft.	(No information from her doctor, except that a joint was tuberculous, not stated which or when. Died, 1936.)	—	—	—
C.S. 136 4.ix.35	F., 26	Domestic worker.	Scars in neck from childhood.	Several yrs.	L. upper lobe, chronic and fibrotic.	None.
C.S. 141 5.ix.35	F., 65	Housewife.	No cerv. Ankle and thigh 15 and 10 yrs. ago.	Three or more yrs.	Whole L. lung chronic and fibrotic.	None.
C.S. 181 12.xii.35	F., 19	Home duties.	None.	5 mths. Died April, 1936.	Tuberculous pneumonia.	None.
C.S. 188 11.i.36	F., 41	Housewife.	None.	9–10 yrs. P.T. in 1927. Sputum in 1935, free in interval.	Both lungs slight. No cavities. No hæmoptysis. Gl. in mediastinum.	None.
C.S. 212 3.iii.36	F., 39	Housewife.	None. Early life on croft with one or two cows.	Vague, cough for a few mths. Died 11.iv.36.	Moist sounds all over both lungs; no cavities.	None.
C.S. 219 14.iv.36	M., 32	Farming.	None.	7 yrs.	In 1930, upper third R. lung with cavity. In 1936, whole R. lung, but disease now chronic and fibrotic.	None.
C.S. 228 8.v.36	F., 39	Domestic worker.	Neck gl. incised, 1930. Cerv. caries and retro-pharyng. abscess, 1931. Dorsal caries, 1933.	Not known. Died 11.vi.36.	No pulmonary symptoms up to December, 1934. Widespread infiltration both lungs in April, 1936.	None.
C.S. 236 2.vi.36	F., 26	Domestic worker.	None.	Cough and losing weight 1 yr.	Base R. lung only. Apices free.	None.
C.S. 287 15.xii.36	F., 27	Housewife.	None.	"Weak chest" since school days. Asthma for 5 or 6 yrs. Cough for 2 mths.	Both lungs moist sounds all over.	Yes.†
C.S. 293 29.xii.36	F., 30	Housewife.	—	5 mths. Died 7.i.37.	Bilateral.	None.
C.S. 301 18.i.37	M., 71	Retired cattleman.	—	5 mths. Died diabetic coma.	Whole L. upper infiltrated.	Mother and brother died of P.T.†
C.S. 303 9.i.37	M., 32	Farmer.	None.	Probably 2 yrs., only recently real ill health.	Advanced bilateral disease of both lungs with caseation and hæmoptysis.	None.
C.S. 321 26.iii.37	M., 59	Farmer.	None.	Unwell for 3 yrs., chest and debility, no doctor till 5 days before death, 26.iii.37.	Extensive bilateral. Death due to hæmoptysis.	None. Except one sister who died of meningitis, aged 13.
C.S. Q.12 24.iv.37	M., 25	Farm servant.	None.	? Pott's disease in childhood.	No active signs. Treated for "pulmonary congestion" in April, 1937.	None.‡

* A sister (aged 19) died of pulmonary tuberculosis (P.T.) in 1931. A brother (aged 20) and a sister (aged 18) had neck glands excised at 7 years (1921) and 4 years (1920) respectively. † Uncle and husband's brother died of P.T. Cousin with P.T. alive.

‡ During the period from April 23rd to June 21st, 1937, 106 specimens of sputum, negative microscopically, were examined for tubercle bacilli by culture. All were negative in culture except one (C.S. Q.12) which produced numerous typical bovine colonies after concentration. Tubercle bacilli were demonstrated in the sediment of the sputum 16 days later after it had become fluid through decomposition.

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TABLE II—GIVING SEX, AGE, OCCUPATION, AND CHIEF CLINICAL PARTICULARS OF EACH BOVINE CASE—(*continued*)

Case No.	Sex and age.	Occupation.	Previous glandular tuberculosis.	Clinical duration of pulmonary tuberculosis.	Distribution of tuberculosis.	Family history.
			COUNTY CASES—(*continued*)			
C.S. 330 7.v.37	F., 28	Housewife.	None.	Cough practically since childhood. Nothing made out 3 mths. ago. Diagnosed early May, 1937.	Cavity R. apex and one in centre R. upper lobe. Evidence acute T.B. whole R. lung and a few moist sounds at L. apex in front.	None.
C.S. 356 13.viii.37	M., 20	Student.	Excision tuberc. neck gl. December, 1936.	June, 1937.	Bilateral central disease with extension to whole R. lung with marked cavitation.	None.
C.S. 357 5.viii.37	F., 62	Housewife and milker.	None.	"Bronchitis" for last 12 yrs. Sputum first tested in July, 1937.	Lower half R. lung very dense and blurred; rest of R. and most of L. lung much mottling (X ray report). Present condition, extensive bilateral activity with much fibrosis.	First husband died P.T. 1908.
			CITY CASES			
A. 5 8.ii.35	F., 54	Housewife.	None.	Indefinite, never robust; cough and chest pain many yrs.	L., universal multiple cavitation; also R. upper. Old extensive chronic disease.	Yes (see text).
A. 24 20.ii.35	M., 40	Army and then tallow factory.	None.	Indefinite, ? 2 yrs.	R. hilo-apical with cavity in apex. L. central infiltration.	None.
A. 36 12.iii.35	M., 62	Lawyer.	None.	At least a yr.	Both lungs, particularly L. ? cavity L. upper.	None.
A. 41 20.iii.35	F., 24	Clerk.	Abd. gl. at oper. at 5 yrs. (Cerv. gl. excised at 9 yrs.)	Since November, 1934.	Bilateral, very extensive, rather acute type with recent cavities.	Mother's side.
A. 57 13.iv.35	F., 25	Warehouse attendant.	Neck, axill., and abd. gl. calcified.	L. pneumonia February, 1932.	L., patchy infiltration mostly central with cavities in upper zone. R., calcified spots throughout and in hilum.	One sister P.T., one brother neck gl.
A. 63 17.iv.35	M., 24	Van-driver.	None.	Cough over a yr.	Bilateral, very extensive old disease, R. mostly central and L. apical, cavities both areas.	Father ?
A. 68 30.iv.35	F., 34	Housewife.	Calcified gl. in neck.	5 wks.; hæmoptysis 10 days before admission.	L., moderate with apical cavity. R., only central and radial opacities, no infiltration.	Uncle died P.T.
A. 73 13.v.35	F., 20	Telegraphist.	None in neck, abd. T.B. disease suspected.	Bronchitis 4 mths. before death.	L., very large cavity upper zone. R., central infiltration, acute lesion with small cavity in extreme apex.	Three aunts died P.T.
A. 104 27.vi.35	M., 29	Lithographer, forestry comm., bospital attendant.	None.	Indefinite, "smokers' cough" for 2½ yrs.	Bilateral, R. subapical and cavitation; L. upper entirely with cavitation. Improved under treatment.	None.
A. 110 10.vii.35	F., 33	Book-keeper.	None.	2½ yrs. at least.	Progressive disease confined to R. lung—mid and lower lobes. Improved under treatment but large central cavity persists.	None.
A. 138 18.x.35	F., 24	Housewife.	No neck gl. "Typhoid" at 12 or 13. Appendicectomy at 13.	7 or 8 yrs.	Bilateral extensive, espec. L.; large cavity L. apex and smaller ones below. R., large subclavicular cavity.	None.§
A. 191 14.iv.36	M., 32	Joiner.	None.	6 yrs. at least.	R. upper lobe cavity.	None.
A. 199 28.iv.36	M., 30	Bank accountant	None.	About 1 yr.	Bilateral, L. apex (older) and R. lower (acute spread). Laryngitis.	None.

§ Parents were farmers. When patient was 14 a cow whose milk was drunk at home died of tuberculosis.

part of a primary egg culture, or about 80 bacilli according to an estimate by cultivation. Of the rabbits 11 died of acute general tuberculosis in 14–24 days; 2 that received a millionth of a primary culture died of typical severe general tuberculosis in 66 and 88 days. The remaining 39 died of typical disease in 25–63 days (average 38·1 days).

Fifty-two rabbits were injected subcutaneously with 10·0 mg. of culture or less (48 strains from 39 cases) and died in 29–104 days; 2 of the rabbits, each inoculated with a different strain, showed only slight general tuberculosis after 29 and 32 days; each of these strains caused typical severe general tuberculosis in another rabbit. Only 6 of the rabbits lived longer than 79 days, dying of typical severe disease in 84, 89, 90, 91, 100, and 104 days respectively. The remaining 45 died in 33–79 days (average 57·8 days) of typical "bovine" general tuberculosis.

One rabbit was inoculated subcutaneously with sputum from C.S. 103, the dose being 0·25 c.cm. The animal died of severe general tuberculosis in 67 days.

CLINICAL DETAILS

Of the 44 persons with bovine bacilli in the sputum 15 were males and 29 were females; their ages ranged from 17 to 71 years. The duration of the clinical tuberculosis from the first appearance of symptoms to the date of the first sputum examination ranged from a few months up to 9 or 10 years.

In 7 instances there was a long history of chest trouble with no definite date of onset. In 11 of the 44 cases there was previous glandular tuberculosis, occurring in the neck in 9 (also abdomen in 1) and in the abdomen in 2 instances. In 2 further cases (A. 73 and A. 138) there were abdominal symptoms in early life the cause of which was not established. One patient suffered from previous bone and joint tuberculosis. The periods elapsing in 7 cases between the diagnosis of glandular tuberculosis and clinical signs of pulmonary tuberculosis ranged from 6 months up to about 18 years. In the remaining 4 cases the periods were indefinite.

Of the 44 bovine cases 19 (14 females and 5 males) were married and had altogether 57 children. Of these 5 died in infancy; 1 died of pulmonary tuberculosis before the bacteriological investigation of the mother's sputum and 51 were living when the parents' sputum was examined. Of the surviving children 45 were apparently well; 3 had coughs when examined but were not clinically tuberculous; 1

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had had a leg amputated on account of "bone disease" and 2 of 3 tested with tuberculin gave a positive skin test.

A family history of tuberculosis was given in 13. Material for bacteriological investigation was not available from any of the affected relatives owing to their death before the bovine case was diagnosed. We give a brief account of the history of one patient, many of whose relations died of tuberculosis.

A. 5.—The patient was born and brought up on a croft with one cow. She had never been robust and suffered from occasional cough and chest pain for many years. When examined at the age of 54 (in February, 1935) there was extensive chronic disease with universal multiple cavitation on the left side and similar disease of the right upper lobe. She died on May 27th, 1935.

Her mother died at the age of 73 of chronic bronchitis and her father (age unknown) died of "pneumonia" which was said to be probably tuberculous.

The husband, a stone-cutter, who had spent most of his boyhood on a farm, was notified in March, 1935, when he was found to be suffering from advanced pulmonary tuberculosis, especially on the right side. He died in April, 1935, three weeks after he was notified. Sputum was not sent for examination.

Two years before the wife came under observation two of her brothers died of pulmonary tuberculosis, aged 39 and 53 years respectively.

There were six children, three of whom died in infancy. A daughter was notified in 1929, at the age of 14, as suffering from pulmonary tuberculosis. She died of tuberculosis two years later. A daughter, aged 26, was radiographed but nothing definitely tuberculous was seen. Another daughter refused to be radiographed.

REGIONAL DISTRIBUTION

Of the 44 bovine cases 13 occurred among the 294 persons from the city of Aberdeen. The bovine cases in this series are unevenly distributed, 8 of the 13 occurring in the first and 5 in the second hundred, while among the last 94 there is no instance of bovine infection. On inquiring into the histories of the 13 city cases we found that 7 were brought up, or as children had spent their annual holidays on farms and were therefore probably primarily infected in the country. Though we did not obtain a similar history in any of the remaining 6 city cases the possibility that some of these persons may also have been infected with bovine bacilli during visits to the country cannot be excluded.

The remaining 31 cases of bovine pulmonary tuberculosis were found among the 342 county cases and were distributed throughout the series. The first hundred positive cases contained the greatest number of bovine infections—namely, 13, which is only one less than the total for the next *two* hundred cases (7 and 7 per cent.) The last 42 cases have yielded 4 instances of bovine infection. Table I gives the proportion of human (divided into eugonic and dysgonic) and bovine strains found in the different counties and in the city of Aberdeen.

The 31 county cases were distributed among four counties on the mainland and the Orkney Islands. In our first report the 13 cases recorded occurred in three counties—Aberdeenshire, Banffshire, and Morayshire—giving, as already stated, the high percentages 15, 18, and 25 respectively. The additional cases from these counties examined since then have contained a smaller proportion of bovine infections and have reduced the previous percentages to 8·6, 11·6, and 12·5 respectively. The new county in which bovine cases have been brought to light is Caithness, where 2 out of 15 (13·3 per cent.) were found to have bovine tubercle bacilli in the sputum. From the Orkney Islands, although only 13 cases have so far been examined, no fewer than 4 (30·8 per cent.) were bovine infections, whereas from the Shetland Islands none of 34 cases was due to this type of bacillus. Four counties—viz., Kincardine, Inverness, Sutherland, and Nairn—have not as yet yielded a case of bovine pulmonary tuberculosis though from the first county as many as 25 cases have been examined. The remaining three counties together have contributed only 7 cases.

CASES YIELDING TUBERCLE BACILLI OF THE HUMAN TYPE

The cultures from 592 cases belonged to the human group of tubercle bacilli. Of these 570 were typically eugonic and 22 exhibited the cultural characteristics and virulence of the dysgonic variety of the human type.

The ages of the patients, of whom 318 were males and 274 were females, ranged from 9 to 83 years. Of the 281 city cases 14 were under twenty and 59 over fifty, and of the 311 county cases 28 were under twenty and 39 over fifty.

The bacilli in the sputum of two cases showed numerous branched forms. The cultures from these sputa were typically eugonic and exhibited for the rabbit and the guinea-pig the virulence of the human type of bacillus.

Cattle contacts.—Only 7 of the 44 bovine cases came into direct contact with cattle in their employment or occupation. One of them (C.S. 19), an occasional farm-worker, had had cervical gland tuberculosis in childhood and was probably infected with bovine bacilli through milk. The remaining 6 persons gave no history of glandular tuberculosis, either in the neck or in the abdomen. Three were farmers, one was a cattle-dealer, one was a farm servant, and one was a milker. Two of the farmers and the cattle-dealer died a day, a few weeks, and 4 months respectively after their sputum was sent for examination.

Of the 311 persons (county cases) with tubercle bacilli of the human type in the sputum 33 were employed on farms.

SUMMARY

(1) Cultures of tubercle bacilli have been obtained from the sputum of 636 cases of pulmonary tuberculosis occurring in north-east Scotland, 342 from the rural and small urban districts, including the Orkney and Shetland Islands, and 294 from the city of Aberdeen.

(2) Of the 342 county cases 31 (or 9·1 per cent.) and of the 294 city cases 13 (4·4 per cent.) yielded tubercle bacilli of the bovine type.

(3) All the strains, 84 in number, obtained from the 44 bovine cases were typically dysgonic and fully virulent for rabbits.

(4) Of the 31 county bovine cases 12 were contributed by Aberdeenshire (8·6 per cent. of 139 cases), 8 by Banffshire (11·6 per cent. of 69 cases), 5 by Morayshire (12·5 per cent. of 40 cases), 2 by Caithness (13·3 per cent. of 15 cases), and 4 by the Orkney Islands (30·8 per cent. of 13 cases).

(5) No bovine case has yet been found in the other counties—32 cases examined—or in the Shetland Islands among 34 cases.

Our thanks are again due to Dr. H. J. Rae, chief regional medical officer, to Dr. G. S. Banks, regional tuberculosis officer, to the medical officers of health of other authorities, and to very many medical practitioners for their courtesy and kindness in supplying specimens and information.

REFERENCE

Griffith, A. S., and Smith, J. (1935) *Lancet*, 2, 1339.

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MEDICINE AND THE LAW

Progress in the Prison

THE annual report of the Commissioners of Prisons (Cmd. 5675. 2s.) shows that in 1936, the year under review, the prison population is still falling. Nowhere is the improvement more striking than in the statistics for women; the number admitted in 1936 is less than half the number for 1921 and hardly more than a quarter of the number for 1913. Nearly half those received on conviction in 1936 were elderly female offenders against the liquor laws. Most of these seem to be taking their admission as a period of recuperation between one drinking bout and the next. The type is not being recruited from among the younger women, and in a few years' time the totals will be negligible. The health of both sexes remains good. Interesting progress has been made with the surgical unit established at Wormwood Scrubs nearly two years ago. In the nine months of 1936 there were 78 operations, in 1937 there were 142. There were 45 for radical cure of hernia, 32 abdominal sections, and 5 laparotomies for removal of foreign bodies purposely swallowed. Mr. Guy Chambers, the visiting surgeon, is reported as having gained the entire confidence of his exacting patients. There is so much work that on operating days a sister is borrowed from Holloway prison to help the permanent sister at Wormwood Scrubs. Emphasis is laid on the proved advantage of employing nursing sisters for male patients convicted of all sorts of crimes. This experience is confirmed even at Parkstone where the most difficult convicts in the country are assembled. Dr. Norwood East, the medical commissioner, evidently looks forward to the day when there will be a nursing sister on the staff of every large prison. These surgical operations at Wormwood Scrubs are additional to the ordinary system of releasing prisoners for operation in local hospitals. Borstal youths, it is said, frequently ask for operations to fit them for ordinary work during their Borstal training and on release.

Dr. East contributes, as usual, some wholesome observations upon criminal responsibility and culpability. The two things, he reminds us, are very different, and the failure to distinguish between them is bad alike for society and for medical reputation. Criminal conduct he regards as just a variant of ordinary human behaviour, not necessarily or even usually allied to mental disorder. Irresponsibility, or a lessened degree of culpability, is put forward almost daily as a defence when there is nothing to support it but an abstruse psychological hypothesis which has no relation to the case before the court. A young man, for instance, attacks his father in defence of his mother. At once the incident is put forward as an example of the œdipus complex even though his attachment to his mother is normal and free from incestuous desires. Dr. East has clear views as to the classes of prisoner for whom psychological treatment is profitable. He mentions the work done at Wormwood Scrubs with selected prisoners by Dr. W. H. de B. Hubert who joined the staff as psychotherapist in 1934. The four-year programme then initiated is now nearly completed and we are promised presently a statement of the conclusions emerging from this study. Meanwhile we are warned not to expect too much. The normal man, if such a creature there be, has, in Dr. East's opinion, a stronger tendency to break the law and to acquiesce in certain offences than has sometimes been supposed. It is convenient to think of him as normal if his law-breaking cannot be attributed to pathological causes. The number of offenders in this normal group is high. Psychological treatment is not for them.

Of prison life in general the commissioners tell a rosy tale. There are libraries and cinematographs, wireless, and physical training, a revolutionary scheme of earnings for work done, and cigarettes to be smoked in the cells. Coat-frocks for the women replace the old ill-fitting uniforms and give a new sense of self-respect. Long-term star convicts go from Maidstone to Dartmoor in the summer months. The Borstal institution grows daily more like the public school. And yet, in spite of all, the prison population is still falling.

AN AMERICAN HEALTH PROGRAMME

SOME three years ago President Roosevelt appointed an interdepartmental committee to coördinate the health and welfare services of the United States government, and last month the committee received from its technical subcommittee a report which the chairman, Miss Josephine Roche, has submitted to the President. The report states [1] that though great advances have been made in America in the control of disease and the promotion of health, the amount of preventable sickness and disability that still continues and the prevalence of avoidable economic burdens due to sickness costs afford grounds for grave concern. This is not because there is lack of knowledge; in some respects the resources exceed the need. But there are economic barriers between those needing service and those willing to render it, and the situation calls for a national plan for the economic application of resources to improve the health of the people.

The subcommittee recall that in a representative sample of the urban population studied in the recent national health survey 40 per cent. of the persons were members of families with annual incomes of less than $1000; 65 per cent. of families with less than $1500; and 80 per cent. with incomes of less than $2000. In 1935 about one-half of the group with incomes under $1000 received relief during some part of the year. Estimates made of the cost per head of providing adequate medical care range from $100 a year per family of four to double that amount; and an examination of family budgets shows that families with incomes not exceeding $1000 a year cannot afford to spend $100, on the average, for medical care. The subcommittee think this is probably true also of families with incomes not exceeding $1500. They conclude that at least one-third, perhaps one-half, of the American people are too poor to pay the full cost of the medical services they need. The position has been mitigated by an extensive development of free, or part-payment, clinics and hospitals in recent years, and by much gratuitous service given by the medical profession, but the report states that "the fact remains that large costs still fall on small purses." For the families of wage-earners the position is specially serious; for the maximum need of medical care often arises when disabling sickness has caused loss of wages. This is a risk against which the wage-earner cannot budget individually, and the subcommittee think there is urgent need for social insurance or systematic public assistance.

[1] See *J. Amer. med. Ass.* Feb. 26th, p. 656.

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According to the report, there are 165,000 medical practitioners in the United States, or 128 per 100,000 of the population. This number is thought to be sufficient if the practitioners were evenly distributed; they are now too much concentrated in the large towns. This is true also of private nurses, and there is a serious deficiency of public health nurses. The number of dentists is 71,000, and estimates of the need for dental care indicate that this number could be doubled without exceeding the true need. The number of hospital beds in the United States is stated to be about 1,100,000, and it is estimated that 400,000 more beds are required, and that the additional provision should include at least 500 hospitals of from 30 to 60 beds each in rural areas with inadequate hospital facilities. It is also recommended that special hospitals should be provided for chronic diseases—e.g., cancer, diabetes, heart and circulatory diseases, and kidney diseases—which owing to the continued ageing of the population are assuming greater importance. Such diseases require much individual attention, which can often be given more effectively in a hospital with modern facilities for diagnosis and treatment than by a *private* practitioner. It is estimated that 250,000 additional beds should be provided for such cases.

THE RADIOGRAPHER'S LIABILITY AT LAW

THE radiographer is a highly trained expert who handles delicate and potentially dangerous mechanism. In spite of all precautions mishaps are bound to occur from time to time, and a patient or relative may sustain injuries which lead him to seek compensation by an action at law. The Society of Radiographers, feeling that the risk to their members is an important one, held a mock trial at the Cowdray Hall, London, W., on March 19th, to illustrate the legal position.

The case of Martin *v.* Northside Hospital and Violet Wray, which took place before a large and delighted audience, was a triumph for Mr. Cuthbert Andrews, the producer. His legal procedure may not have been accurate in every detail—he disclaimed any attempt to make it so. But the cast succeeded in reproducing the atmosphere of a King's Bench court so faithfully as to cause the illusion in at least one visitor familiar with it that he was in his usual place of work. The light comedy which was the keynote of the trial was well thought out and maintained. Particularly appreciated were the learned judge's question: "What is a radiographer?," introducing a concise didactic definition by the radiologist witness, Dr. E. Rohan Williams (part-author, with Dr. Duncan White, of the script); and his lordship's profound slumber during an interminable lecture on X ray risks in general by the expert, Prof. Littlar (Mr. G. W. C. Kaye, D.Sc.). The summing-up, and a quite irregular peroration after the verdict, set out the principal object of the trial.

Mr. Crawland Snoop, K.C. (Mr. Cuthbert Andrews), for the plaintiff, was incredibly realistic and exactly like some not quite identifiable member of the Chancery Bar; Sir Archibald Head, K.C. (Dr. J. Duncan White), appeared for the defendants. The judge was Mr. Justice Likely (Mr. J. A. Crowther, Sc.D.).

The subject matter of the action was simple. A mother, helping to hold her small boy during a radiography after an injury, had jumped up at the moment of exposure and received a somewhat severe electric shock, and sued the hospital and the lady radiographer in charge. The hospital was dismissed from the suit at the outset on a submission in law, and the radiographer was found not to have been negligent.

Opening the case, Mr. Snoop said that the youngest child of his client, Mrs. Maria Martin, while playing some boyish game, fell and hurt his arm. His mother took him to the Northside Hospital, where it was decided that the limb should be X rayed. While the child was under the X ray the mother received a terrible electric shock and had not yet, months after the accident, fully recovered her mental equilibrium. At great personal inconvenience she had compelled herself to three weeks' inaction at a resort called Southend-on-Sea. She claimed substantial pecuniary solace for the immediate effects of the injury, recompense for disbursements made during her convalescence, and damages as a deterrent to the future involvement of our needy and afflicted poor in such an accident.

Sir Archibald Head then submitted that there was no case against the hospital, for it could not be held responsible for individual acts of its technical employees if it had taken steps to ensure that they were properly qualified. It was manifestly impossible for an overworked and harassed chairman of governors to spend his spare minutes tasting the gruel in the kitchen and counting the bloody sponges in the operating theatre. The judge, on the authority of Hillyer *v.* St. Bartholomew's Hospital (1909, 2 K.B. 820), dismissed the hospital from the action, but ordered the case against the radiographer to proceed.

Mrs. Maria Martin, of 27, Red Barn-court, said that the young lady had put the boy on a table and put a "lamp thing" on top of him and told her to sit down, and then she felt a dreadful pain and knew no more. On cross-examination she admitted that the radiographer had said "Sit there and keep quite still." A friend, Miss Amelia Hobbs, spoke of the ill effects of the shock and admitted having gone to Southend with the plaintiff and her sister. A radiologist, Dr. O. H. Maloney, said that the radiographer was most competent and reliable both in her hospital practice and as assistant in his private practice. He described in detail the qualifications required of a radiographer. The judge remarked that the specification sounded like an alliance between the Admirable Crichton and a member of the Angelic Choir.

Miss Violet Wray, the radiographer, said that she held the diploma of the society. She had arranged the tube and set the controls for a rapid exposure, and had told the mother to sit on a chair, keep the child still, and not to move herself. Just as she made the exposure, the child moved and Mrs. Martin jumped upwards and forwards; there was a flash in the region of her head and she sat back in the chair. Miss Wray had found a burn on her scalp and another beneath her suspender buttons; neither was severe. Her conduct of the examination was in accordance with her training and with usual hospital practice.

Prof. Littlar, expert witness for the defence, explained that the voltages used in X ray work were so high that the current might jump across a wide air gap. He outlined the requirements of the International X Ray and Radium Protection Committee and said that a radiologist must impress upon the governing body of his hospital the necessity of complying with these recommendations in every respect.

His lordship summed up, and the jury found that the radiographer had committed no negligence. The judge, agreeing with their findings, remarked that radiography was not free from danger and that, as human beings were not infallible, actions such as the present one were bound to arise. He understood that X ray technicians and other medical auxiliaries had no protection or defence society. It seemed to him a somewhat dangerous state of affairs that such responsible workers as radiographers should be exposed to the hazards of legal proceedings which, even if successfully defended, might impose on them a crushing burden of expense. The Society of Radiographers would do well to consider the possibility of forming some kind of mutual defence society.

With an admittedly serious purpose to fulfil—the establishment by the society of a scheme of legal insurance for members, analogous to that provided by the medical defence societies—it is a great pity that the authors of this burlesque should have missed an opportunity. By dismissing the hospital from the

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suit on grounds which would not have been entertained for a moment by a real court, they evaded altogether a problem at least as important as that of the personal liability of the radiographer. It is, of course, quite possible that a hospital might escape liability for the negligence of a radiographer engaged in her work. The Scots case of Anderson *v.* Glasgow Royal Infirmary (1932, S.C. 245) concerned an injury due to over-exposure during ultra-violet light treatment given by a nurse, and the Court of Session found by a majority that even if the nurse had been negligent the hospital would not have been liable for the consequences. Lord Alness delivered a powerful dissenting judgment which may in future cases carry even more weight than it does at present. The hospital, however, could hardly escape liability if the patient could show that the X ray apparatus was either defective or its design was dangerous and constituted a trap for the unwary. The patient and his mother were quite possibly in the position of "invitees," for whom the surroundings must be made safe. In these days of shock-proof apparatus a case of negligence might almost be made out against a hospital merely for providing an outfit capable of administering a potentially fatal shock to an onlooker who did nothing more than make an incautious movement.

In dealing with the case against the radiographer herself, the authors omitted to include any evidence of negligence at all, and Mr. Crawland Snoop did no more than prove the occurrence of the shock and some resulting injury. Much could have been made of the radiographer's failure to explain to the mother that unless she kept quite still she would run a risk of receiving a shock. The fact that she was helping the radiographer by holding the child might well make the duty to protect her even more imperative than if she had been a mere spectator. These points, and also the evidence for her own contributory negligence in moving during the exposure, might have received closer attention.

The argument for the provision of a defence scheme is none the less valid, for radiographers, in common with many other classes of non-medical workers entrusted with the use of powerful electrical apparatus, are exposed to a definite legal risk. The chances of injury with a diathermy machine are probably very much greater. Moreover, many persons are coming to hold that some form of insurance ought to be provided in the interests of the patient for all non-medical assistants, including hospital nurses. Under the present law the hospital is hardly ever held responsible for the negligence of a nurse in the performance of a technical duty, and the assistant is not likely to have the means to satisfy a judgment for damages.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM VRATCH

IV

THE first Revolution which overthrew the Tzar did not immediately affect the medical work in my village. But within a few months aged patients came complaining of symptoms quite unheard of among the villagers before. Presbyopia had not previously affected the daily life of the peasant, he did no near work; when he cut logs to build his house or sawed wood to make the window frames he did not measure closer than an inch. Old men came to me with aching eyes; for they were learning to read now that they could do so without incurring the suspicion that they wanted to revolt. They borrowed school books and took instruction from their grandchildren. Of their land-hunger there had been much talk before the Revolution came, but I never guessed that the craving for learning would be so strong. It goes to show that when people are denied opportunity for self-development their true level cannot be judged while they are still under subjection. What these good souls got from their reading, their slow fingering of each word, each letter, was certainly but little of the author's meaning; no matter, they said, their children would learn quicker than they did, and in time all would read as freely as the priest.

When a priest moves among his flock he carries with him inevitably something of another life than this of ours on earth, so be he never so human he always sees men as they think they ought to be. But in the great crises of life as well as in the vexing little ailments and injuries, the doctor is called in to help his patients to cling to this morsel of flesh, to get over painful times and get deeper into the present with its everyday activities and its round of duties and cares. For this reason I found my opinion more often sought by the peasants than was that of the priest. His views coloured by his professional attitude to the future, they felt, were not as gross and earthly as theirs or mine.

Much of the aggressive element in the Russian disposition had in the old régime been turned inwards under the influence of an unusually mystical religion and an exceptionally autocratic régime, so that the people were submissive—not docile, that is too passive a concept—and unself-confident, but subject to outbursts of self glorification and indignation against their oppressors. Furthermore they were taxed so heavily that they spited the government by remaining poor. When I asked why with their communal ownership of lands they did not communally own a threshing machine and so save themselves the back-breaking work with the flail or the wasteful treading of the grain by oxen, they answered that they would go on as they were doing rather than give the tax-gatherers the excuse, because they could afford machinery, to raise their dues.

* * *

It has puzzled many how the new régime acquired the power it wields over the minds of the people, since it first taxed the peasants as heavily as did Tzardom and then liquidated them. Apart from the important fact that a majority of the present citizens of the Soviet Republic have never known another régime, I think the main source of its strength lies in the new direction given to the aggressive impulses of the people. When Lenin said "Peasants! seize the land!" many of them had already done so; when the Bolsheviks said "Workers, exploit your every opportunity!" the message did not fall on deaf ears. Work was to be their salvation and factories their new chapels; here they could pit themselves against materials they had hardly dared touch before, lest they call down on themselves an inquisition from the Governing Powers. The tax-greedy bureaucrats stood between the energies of the people and the earth from which they derived both their life and their strength.

In another direction also the new régime met a need of the people. The Orthodox Church had in practice (I do not speak of the theory) two ways of

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dealing with the aggressive impulse; if turned outwards it must be at the service of the Tzar and the State, but it was better to turn it against the self by fasts of inordinate length and most lowering to the physique (my Tartar patients were invariably fitter men at the time of spring ploughing than the Christians), and by a constant preoccupation with the worthlessness and wickedness of the self in wretched contrast to the ineffable glory and kindness of God.

* * *

The brutal anti-God campaign of the Bolsheviks was an endeavour to tap sources of energy of the people. Do not wallow in guilt and self-abnegation! they said in effect, there is nothing to fear but yourselves. Possess yourselves of Russia, master it by work, don't pray for strength to overcome evil, work to make this land and this life better. For the first time the people were both appealed to and given a chance to turn their energies to constructive work. Taxation which gave a minimum return in the way of social services—witness the scarcity of State doctors, in the country districts there were no others—and political oppression lowered the productive interests of the people and bred a hatred of the State. At the same time the hold of the Government was strengthened by suppressing education, freedom of movement, and the marketing of a man's own labour, and by using the Church as an auxiliary of the temporal power. But though the Bolsheviks pulled down the old Gods they set up other Gods in their places, the strong, half-Oriental, cynical portrait of Lenin, a Russian like themselves, was even in his life-time offered for their worship—and accepted.

* * *

There can be no two opinions as to the extent of the change produced by the new religion of work and the new theology of dialectical materialism. The people were free to exploit their energies in a way undreamt of before. Gaffer comes for reading-glasses, the grandson goes to technical schools; the one has begun to give expression to his desire to know more of what is going on around him, the other to master a more complicated trade than his father—to become *skilled*. In the view of the new régime not only the wealth but also the happiness of the people depended on freedom to acquire and use skill. What applied to trades applied also to professions. Tens of thousands of "medical assistants" were trained at short notice to bring medical help to the villages and towns. Their curriculum was sketchy but they were missionaries for better sanitation and a care for health. Only those who knew what conditions were like before should judge of the wisdom of that policy. It is not pleasant to think of the country being over-run by half-trained medical men, but they were better than gamps who use lamp-hooks on a retained placenta, and as the supply of better trained doctors improved, these men could finish their studies.

* * *

The materialist philosophy which guided the energies of the people to constructive work and to the acquisition of skill, and which therefore diminished the tendency to depression, introspection, and pessimism so common in the old régime in all classes of the community, may thus be said in a measure to replace the institutions which ministered to the spiritual needs of the people and furnished them with ideals. But the desire to employ science in the service of man is more readily fulfilled in the physical sciences than in the mental. It is easier to get men to improve their manual skill than it is to change their inner ways of thought.

The almost fantastic depths of self-abnegation and submission common in the days of the mystical Tzardom is not in theory favoured as a national trait by materialist Commissars. But though, according to plan, the workers have risen in their pride, overthrown their oppressors, and asserted their rights as a free people, there is from time to time still an organised orgy of penitence—by proxy. In the State Trials the attitude of objectivity which characterises so much of modern Russian life is laid aside and the accusers, the accused, and the "organs of opinion" (the Press and the Platform) give themselves over to an exercise in moralising and subjectivity that can only come from inner tension and self-distrust.

The service of the materialist revolutionaries has been great, they have opened out a new life to a people who were vilely oppressed, have raised them up and given them not only new hope but the means by which they can consolidate their gains; but the new materialist mode of thought has no rational way of dealing with the inner life of man. It denies the old gods and sets up new idols for worship; to every discovery of science it lends the readiest ear, except those which deal with the sufferings of the mind, and these it does not seem able to probe—or acknowledge.

The Russian attitude towards feelings of guilt has always seemed strange alike to Western and Eastern peoples. In the religion of the old régime it was a central theme, in that of the new it is denied in relation to everything except the State. In the place of the old blasphemy—thoughts of hate against God and not believing in His goodness—there is now the sin of not believing in the perfect suitability of the present rulers and the present materialist philosophy for the needs of the Russian people. Discontent is taken as a sign of the unpardonable sin working in a diseased mind.

The materialism of the present rulers has put them into an awkward predicament; by attempting to eradicate every trace of superstition and bourgeois mentality and presenting the Socialist State and its founders as an object of adoration, they have given their people no alternative to either loving or hating the central power. It is a dilemma which faces the Totalitarian Dictators too. The psycho-analysts have pointed out the way in which the parliamentary governments have overcome the problem: the constitution provides for a permanent or untouchable portion of the governing power (a king or president) and a removable portion (cabinet) which can be sacrificed without disturbing the loyalty to Authority. Thus discontent can find a safe outlet without disturbance or serious break in the function of government, and it is impossible for the executive to bedeck itself with the glamour of omnipotence and omniscience, which is always corrupting to wise judgment. Democracies may bestow dictatorial powers upon an individual for a special occasion, as in time of war or crisis; power thus freely *bestowed* implies the constraining force of a sense of responsibility. It is different when power is *seized*. Violence may be necessary in politics; but violence, however good the end in view, generates feelings of guilt. It is scientifically foolish, and, I believe, in the long run politically imprudent, to deny a factor so important in mental—or political—life.

* * *

Every one of us had mixed feelings on hearing of the fall of the Tzar, nearly everyone rejoiced at the release from constraint, most of us felt that a great

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responsibility was laid upon us. Innocent though we were of the great political event, we felt obliged to shoulder the burden caused by our phantasied complicity in having desired it. The murder of the Tzar deepened the sense of guilt because the image of the Little Father embodied a high ideal.

The ruthless attack on every pre-revolutionary idea and ideal, which followed the Bolshevik seizure of power, can I think be ascribed also to unconscious guilt. If every feature of the bourgeois régime was vile, then the destruction of it by the new government was no crime. Their inner knowledge that not all of it was bad made their hate an intolerable burden on the conscience, and not daring to acknowledge that in the spirit of vengeance they were rooting up wheat with the tares, they declared the whole field fit only for the flames. Such conduct in individuals breeds a troubled mind, and in communities not less.

The denial of the inner life of man (and also, though I have not discussed it here, the attack on the family) seems to me the gravest fault in the Communist régime in Russia; but serious though this is, it must not blind us to the great achievement of the revolution: the Communists have encouraged the initiative and ambition of the people to acquire skill and to use it freely and for the first time in mastering their new possession—their own country.

*** *This concludes the four articles by Vratch. Next month A Consulting Physician will be responsible for these columns.*—ED. L.

PUBLIC HEALTH

Consultant and Specialist Service in London

THE consultant and specialist service in London was first organised on a uniform basis five years ago. The general hospitals were grouped geographically and the various special hospitals, residential schools, and public assistance institutions were linked up with them. This system has worked satisfactorily and has been developed mainly by adding specialties or increasing the number of sessions as required—for example, to ensure adequate supervision of fracture cases and skilled anæsthetists for special operations. The latter have also helped to diffuse the latest methods among the hospital staffs. Three full-time radiologists have been appointed, each serving a number of hospitals, and part-time obstetricians and gynæcologists have replaced the specialists employed under the group scheme. The L.C.C. now claims that it has provided a service which, in its comprehensive character, is probably unequalled elsewhere.

Welfare of the Blind

The Minister of Health has issued a circular to local authorities explaining the provisions of the Blind Persons Bill which comes into operation on April 1st. Under this Bill the age at which a blind person becomes eligible for an old-age pension is reduced from 50 to 40 years, and local authorities are required to provide all assistance to blind persons, other than institutional and medical assistance, under the Blind Persons Acts, thus removing the blind almost entirely from the operation of the poor law. In calculating the amount of financial assistance to be granted to a blind person the needs of his dependants are to be considered and sources of income such as National Health Insurance benefit, disability pensions, workmen's compensation, and the like are to be disregarded, as is now done with applicants for unemployment assistance.

Referring to the recent report on cataract by the Prevention of Blindness Committee of the Union of Counties Associations, the Minister agrees that the facts in regard to operative treatment for cataract should be made more widely known. In considering whether a person who has had the lens extracted from one or both eyes is still to be regarded as blind the Minister quotes the statutory definition of a blind person as "a person so blind as to be unable to perform any work for which eyesight is essential," and does not accept the committee's recommendation that the blind person's vision should be tested with reference to his ability to carry out the work on which he was formerly employed. During the three months after operation normally required for adjustment to the new conditions the patient may still be regarded as blind, and in cases in which, after the extraction of the cataract, the corrected visual acuity is between 3/60 and 6/60 Snellen, the fact that two pairs of strong glasses have to be used for near and distant objects respectively may justify a decision that the person is still blind.

Survey of Hospitals in Cornwall

Dr. E. Donaldson of the Ministry of Health and Mr. R. H. P. Orde, hon. secretary of the British Hospitals Association, have now issued their report on the survey of the hospital situation in Cornwall which they made at the hospitals' request last November. There is no natural centre of population in Cornwall around which its hospitals and health services can conveniently group themselves, and the county is served by five larger hospitals with from 40 to 80 beds and ten cottage hospitals with less than 30. The only hospital which can be classed as a general hospital is the Royal Cornwall Infirmary at Truro, though the West Cornwall Miners' and Women's Hospital at Redruth is developing in that direction. Only the West Cornwall Hospital at Penzance shows signs of being overcrowded, and in no less than eight hospitals the percentage occupation in 1936 was under 65. According to this report there is hardly any coöperation between the various hospitals. There is no attempt to centralise the treatment of fractures, no uniformity in the keeping of records, and the hospitals do not work together in their appeals for funds. Most of the cottage hospitals try to act as miniature general hospitals and the public assistance committee are dependent on the voluntary hospitals for the treatment of all patients needing operations and practically all who are acutely ill.

The report recommends that the existing hospitals of Cornwall should be divided into two groups: a large group based upon Truro and Redruth, and a small one based upon Plymouth. It is unfortunate that the towns of Truro and Redruth, which are only eleven miles apart, did not build a joint hospital which could have acted as a key hospital for the whole of Cornwall. There should, however, be a bringing together of the boards of management of Truro and Redruth hospitals, their staff should be regarded as belonging to one institution, and everything should be done to create in essence a Truro and Redruth hospital which would be one in everything but its buildings. Each hospital should

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continue to develop the special departments in which it has already specialised, Truro developing as an orthopædic centre with a fracture clinic, throat, nose, and ear department, and ophthalmic department, and Redruth providing a maternity and radiological centre linked to the national radium centre at Plymouth. St. Michael's Hospital at Hayle could usefully be used for those patients who require a long stay in hospital and who tend at present to congest the voluntary hospitals or to drift into public assistance institutions.

The formation of a voluntary hospitals regional council, as advocated by the Sankey Commission, would provide a centre for the consideration of problems which cannot be wisely solved by the hospitals acting separately and would supply doctors with the data which is now deprived of much of its value by lack of organised recording.

Medical Members of L.C.C. Committees

The various standing committees of the London County Council include the following medical members:—

Education.—Dr. J. A. Gillison.
Entertainments.—Dr. Bernard Homa.
Establishment.—Dr. Homa.
Finance.—Dr. S. W. Jeger.
Fire Brigade and Main Drainage.—Dr. C. W. Brook.
Hospitals and Medical Services.—Dr. S. Monckton Copeman, Mr. Somerville Hastings, Dr. Homa, Dame Barrie Lambert, Miss Esther Rickards, with Dame Janet Campbell and Dr. Hyman Winch (coöpted), and Dr. F. Lawson Dodd, L.D.S., on a subcommittee.
Mental Hospitals.—Dame Barrie Lambert, with Dr. Doris Odlum (coöpted).
Public Control.—Dr. Jeger.
Supplies.—Dame Barrie Lambert.
Welfare of the Blind.—Dr. Brook.

IRELAND

(FROM OUR OWN CORRESPONDENT)

HOSPITAL DEVELOPMENT IN DUBLIN

A FEW weeks ago the Minister for Local Government and Public Health announced that he was prepared to approve the scheme of hospital development for Dublin which had been recommended in the first report of the Hospitals Commission, and he invited the hospitals concerned to submit their plans to him. The first to obtain official sanction for its plans is St. Vincent's, which proposes to transfer itself from its present site on St. Stephen's Green to a country site at Merrion. It was known that a few years ago the authorities of St. Vincent's—Sisters of the Order of Charity—had purchased the extensive demesne of Elm Park at Merrion with a view to building there, and building will begin forthwith. The property purchased contains some twenty-five acres of open land, and although quite in the country is within the present city boundaries. It is proposed to build a hospital of 550 beds, of which 400 will be for free patients (those not contributing more than ten shillings a week), 100 for poor patients (those for whose maintenance the rating authorities would be responsible), and the remainder for paying patients. It is not known whether the present premises in St. Stephen's Green will be entirely abandoned, but it is suggested that the out-patient department should be retained, with possibly a surgical ward and theatre for emergency or accident cases. The sum of £500,000 is suggested as the approximate cost of the proposed buildings at Elm Park. The other hospitals concerned in the scheme of development are not likely to let the grass grow under their feet now that St. Vincent's has made a start.

The funds accruing to the Hospitals Trust Fund from the sweepstake conducted this week came to just over £500,000. For the last five sweepstakes the hospital receipts have been stabilised near this figure. The total receipts up to the present from the establishment of the sweepstakes in 1930 amount to just over £12,000,000.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MARCH 12TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2515; diphtheria, 1492; enteric fever, 17 (29 "expected"); pneumonia (primary or influenzal), 1430; puerperal pyrexia, 181; cerebro-spinal fever, 40; acute poliomyelitis, 4; encephalitis lethargica, 5; dysentery, 142; ophthalmia neonatorum, 114. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on March 18th was 5526, which included: Scarlet fever, 830; diphtheria, 1211 (carriers 44); measles, 2079; whooping-cough, 271; puerperal fever, 21 mothers (plus 14 babies); encephalitis lethargica, 282; poliomyelitis, 0. At St. Margaret's Hospital there were 32 babies (plus 15 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 55 (13) from measles, 6 (0) from scarlet fever, 14 (3) from whooping-cough, 40 (5) from diphtheria, 50 (17) from diarrhœa and enteritis under two years, and 76 (12) from influenza. The figures in parentheses are those for London itself.

Leicester reported the only death from typhoid. Liverpool had 7 fatal cases of measles, Dewsbury and Manchester each 3. Birkenhead and Liverpool each reported 3 deaths from whooping-cough. Diphtheria was fatal in 25 great towns; Liverpool reported 7 deaths, South Shields 3.

The number of stillbirths notified during the week was 270 (corresponding to a rate of 38 per 1000 total births), including 55 in London.

THE LANCET 100 YEARS AGO

March 24th, 1838, *p.* 929.

From a lecture on the nervous system delivered by Dr. Marshall Hall at the Theatre of Anatomy and Medicine, Webb-street, Southwark.

OF MANIA

THERE is still much obscurity in our views of this sad but interesting subject.

The most important consideration in regard to the *causes* of mania is, undoubtedly, hereditary predisposition. The most powerful of exciting causes is mental harass; the arduous duties of our prime ministers, the anxieties of the Stock Exchange, have frequently led to mania in its worst forms. . . .

Mania, when it does occur, assumes various forms; it is sometimes attended by an expression of the eye and of the countenance, a manner, a demeanour, a loquacity, which denote the utmost excitement; in other cases it is moping, melancholy, with a corresponding attitude and taciturnity; in a third instance there is a monomaniacal disposition to suicide or homicide; in a fourth patient we may have nymphomania.

The first symptom is frequently wakefulness. Never neglect this symptom. . . .

Then some incoherent idea is expressed; love is changed into hatred; friends are viewed as enemies; prosperity as ruin; there are suspicions of a thousand kinds; despondency, or absolute despair. . . .

An important question is that which relates to the morbid anatomy: is this *cause* or *effect* of mania? . . . I fear this point has not been sufficiently considered by those who have addicted themselves to this department of medical science. It is sad to observe how a little effusion, a slight layer of lymph, is the *cause* of everything in the minds of some of these gentlemen of one idea.

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CORRESPONDENCE

OUR COLLEAGUES IN AUSTRIA

To the Editor of THE LANCET

SIR,—In view of recent events, we the undersigned members of the medical profession desire to express our alarm at the possible fate of our colleagues in Austria. There are in that country many revered physicians and surgeons who are likely to fall into disfavour with the National Socialist Government either on account of their medical or social views or on account of their belonging to the Jewish race. Judging from what has happened in Germany in the past, we are afraid that serious discrimination will be exercised against them and that even the chance to leave a country which is no longer hospitable to them may be refused.

We beg our colleagues in all countries to watch the progress of events with the closest attention and to do all in their power, whether by public protest or by public or private assistance, to stand by any member of our profession who may suffer hardship under the new régime.

We are, Sir, yours faithfully,

(Signed) W. RUSSELL BRAIN, HORDER, W. MCADAM ECCLES, ALAN MONCRIEFF, ARTHUR ELLIS, J. P. MONKHOUSE, RICHARD W. B. ELLIS, E. P. POULTON, DAVID FORSYTH, H. E. ROAF, R. D. GILLESPIE, JOHN A. RYLE, DONALD HUNTER, ADRIAN STEPHEN, ARTHUR HURST, C. P. WILSON, ROBERT HUTCHISON, W. H. WYNN.

March 21st.

THROMBOSIS AND HEPARIN

To the Editor of THE LANCET

SIR,—I was most interested to read the two articles in your issue of March 19th on the treatment of thrombosis by heparin. Drs. Holmin and Ploman in reviewing a case of thrombosis of the central retinal vein state:

"It is hardly necessary to discuss the diagnosis, thrombus in the main trunk of the central vein of the retina. The sudden decrease in vision indicates a circulatory disturbance and the ophthalmoscopic finding is characteristic."

Surely it is just this question of diagnosis which requires the fullest discussion. If actual thrombosis of the central retinal vein had occurred it is difficult to believe that any amount of heparin would have been capable of restoring circulation in the manner which they describe. Repeated observation compels the conclusion that in those cases where vision returns either spontaneously or as a result of treatment no actual thrombosis can have occurred, and that the observable circulatory disturbance in its early stages, and in probably the majority of cases, must rather be attributed to obliteration of the lumen of the vessel either by local vaso-spasm or by œdema of surrounding tissues. The same argument must be true of so-called thrombosis in other vessels, as for example the cerebral or coronary arteries. In the presence of arterial disease subsequent thrombosis may occur extremely quickly, but it is often astonishing how long it may be delayed.

I well remember being called to see a lady of 72 with a very high blood pressure who for five days had been deeply unconscious with a left hemiplegia. I read the death sentence to a large gathering of relatives before administering my routine treatment of intensive amyl nitrite. Much to my astonishment and confusion the patient became semi-conscious in 10 minutes, was talking in half an hour, and was as well as ever in three days.

While subscribing to the value of heparin in the treatment of these conditions I submit that its principal value lies rather in the prevention of clot formation in a stagnant circulation and only to a very much less extent in the inhibition of increment to a clot which has already formed (as in Dr. Magnusson's case). In other words I regard it as an auxiliary to, but by no means a substitute for, existing lines of treatment which must still be directed at the urgent relief of the underlying vaso-spasm. That the latter measures by themselves were adequate, provided that the patient was seen in good time, is evident from my own small group of cases of "thrombosis" of the central retinal vein. Far from being "unique to witness the disappearance of hæmorrhages and the increase of vision to its normal value in so short a time as five to six weeks" I am led to believe that such a result should be anticipated with reasonable confidence in patients who report as early as the hospital nurse under review.

Finally I cannot refrain from hazarding the guess that the underlying vasomotor instability of both subjects is of climacteric origin. The nasal catarrh and unilateral grinding headache in the nurse aged 52 and the recent onset of mild diabetes in the neurological case aged 48 would strengthen this assumption. If this be so then further vascular crises can be predicted with reasonable certainty unless this tendency can be adequately controlled by the correct employment of œstrogenic substances.

I am, Sir, yours faithfully,

Manchester, March 21st. H. R. DONALD.

PURPURA FOLLOWING SEDORMID

To the Editor of THE LANCET

SIR,—I have seen, within the last few weeks, two cases of severe thrombocytopenic purpura following the use of Sedormid for insomnia. Both patients were middle aged; both had been taking sedormid each night unknown to their medical attendants, one for three months, the other for three weeks; both showed a profuse purpuric rash which involved the skin as well as the mucous membrane of the mouth; and both had severe bleeding from the kidneys. Both recovered quickly when the sedormid was withheld; no other treatment was used except a high calcium diet. Only in the first case were blood counts taken; these showed a progressive anæmia to 50 per cent. of normal and a drop in the platelet count to 80 per c.mm. Loewy described three such cases in your columns (*Lancet*, 1934, **1**, 845); but, as far as I can find, this is the only English reference to this condition, though Lieberherr (*Med. Klin.* 1937, **33**, 475) gives seven references to this allergo-toxic reaction. As sedormid, allyl-isopropyl-acetyl-carbamide, is usually considered to be non-toxic I think it is, perhaps, worth while reminding your readers that its use is not unattended by the danger of severe purpura developing in those who are susceptible to its action. I am, Sir, yours faithfully,

Wimpole-street, W., March 19th. JAMES TORRENS.

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DIPHTHERIA—A PREVENTABLE DISEASE

To the Editor of THE LANCET

SIR,—Supplementing the recent communication (Feb. 12th, p. 391) under this heading by FitzGerald, Fraser, McKinnon, and Ross, the following additional information relating to notifications of cases of diphtheria in England and Wales and in Canada for the period August 28th, 1937, to Jan. 29th, 1938, is set out here. It will be seen that the incidence

DIPHTHERIA CASES REPORTED

Week ending.	England and Wales.		Canada.	
	Cases.	Rate per 100,000.	Cases.	Rate per 100,000.
1937.				
Aug. 28th	910	2·2	30	0·3
Sept. 4th	1084	2·7	58	0·5
„ 11th	1241	3·0	43	0·4
„ 18th	1308	3·2	81	0·7
„ 25th	1320	3·2	71	0·6
Oct. 2nd	1348	3·3	67	0·6
„ 9th	1451	3·5	80	0·7
„ 16th	1566	3·8	82	0·7
„ 23rd	1706	4·2	104	0·9
„ 30th	1694	4·1	106	0·9
Nov. 6th	1698	4·1	99	0·9
„ 13th	1750	4·3	117	1·1
„ 20th	1634	4·0	92	0·8
„ 27th	1830	4·5	120	1·1
Dec. 4th	1765	4·3	119	1·1
„ 11th	1683	4·1	92	0·8
„ 18th	1568	3·8	76	0·7
„ 25th	1291	3·2	73	0·7
1938.				
Jan. 1st	1417	3·5	77	0·7
„ 8th	1584	3·9	57	0·5
„ 15th	1659	4·1	78	0·7
„ 22nd	1737	4·3	74	0·7
„ 29th	1892	4·6	107	1·0

These rates are based on the estimated populations for 1936 :

England and Wales	40,839,000
Canada	11,014,000

of the disease is consistently four to five times greater in the former administrative area than in the latter. The widespread employment of diphtheria toxoid in vaccination against the disease in Canada would appear to be the only factor which can be held accountable for this difference.

I am, Sir, yours faithfully,

J. G. FITZGERALD,
Director, School of Hygiene and Connaught
Feb. 26th. Laboratories, University of Toronto.

ELECTROSURGICAL OBLITERATION OF THE GALL-BLADDER

To the Editor of THE LANCET

SIR,—I have read Dr. Thorek's paper on electrosurgical obliteration of the gall-bladder in THE LANCET of Jan. 1st and would like to make a few observations on it, especially as I have been asked from time to time to record in English my results with this method.

My experience with electrosurgery of the gall-bladder extends over more than 14 years. In 1924 I used a special high-power Paquelin cautery, but as soon as suitable apparatus for electrocoagulation was introduced I adopted this as having many technical advantages. In the following years I developed the technique and have now used it in more than a thousand cases. Many prominent surgeons tried the method after my first papers and Mirizzi, Jacobowici, Popp, and others reported favourably upon it. In 1932 I showed a cinema film of the operative details at the international congress at Vichy.

Thorek's paper seems to give the impression that the procedure he is describing is a new one. Such an impression would not, I think, be justified. It is not correct to speak of two different methods, for I used deep electrocoagulation for certain cases from the beginning (*Zbl. Chir.* 1929, **56**, 1054). The depth of electrosurgical destruction must depend on *individual conditions*. Where the inflammatory process is limited to the mucous membrane, destruction of the inner coats, leaving the serous coats intact, is quite sufficient, but the destruction must be thorough. When Thorek says that he observed regeneration of the mucous membrane he proves that he did not perform the operation according to my description. Popp, who saw the procedure in my clinic, had occasion to reopen the abdomen of a patient on whom he had done a correct mucoclasis some time previously and found only a small fibrous scar where the gall-bladder had been (*Zbl. Chir.* 1931). It is not in fact advisable to destroy the serous membrane in all cases, for it seldom contains active germs and its defensive properties make it an excellent protection for the more delicate tissues. It is much better to use the serous coats of the bladder, which never cause relapses from infection, than a free graft such as Thorek suggests, for in grafted tissue necrosis is very common—especially over a necrotised tissue where there is heavy infection. The source of "bacterial relapses" after cholecystectomy is usually the liver itself, which always harbours germs in the small bile-ducts, in the interstitial pericapillary tissue, and in the reticulo-endothelial cells. In my opinion a hepatitis always precedes recurrences. Where there is phlegmonous inflammation and abscess-formation the situation is entirely different. Here I advise the destruction not only of the whole gall-bladder but also of all abscesses deep in the liver parenchyma. Electrocoagulation is far the best method of treating liver abscesses in general.

Increasing experience leads one to realise more and more the importance of adapting one's procedure to each individual case. The gall-bladder is by no means a useless organ, but has definite functions, as recent research has clearly shown. For this reason I try, where its function is still good and the walls are not too much inflamed, to preserve the organ by performing a cholecysto-choledochostomy. I have performed this conservative operation in 32 cases, and other surgeons such as Schönbauer of Vienna can confirm its success. I understand that Thorek applies my radical electrocoagulation to all (even the most simple) cases, and this I personally regard as too rigid a procedure. Nevertheless I am very glad to hear of his excellent results, which prove that the method represents a valuable advance and confirm my statistics of ten years ago.

On the question of drainage Thorek mentions nearly all the points which I described as "the sins of drainage" (*Med. Klin.* 1928, **24**, 1147), when I advocated primary closure of the abdominal wall without drainage after mucoclasis. But there are exceptions in which it is advisable to insert a small rubber drain. This is not of course done to provide an exit for an undesired flow of bile, for such a flow does not occur with this technique. After all operations, however, products of damaged tissue, especially amines, remain in the field and affect the peripheral circulation and lower the blood pressure. When we close the abdominal cavity completely in cases where the operation field is not absolutely dry, and all the organs are not covered with serous tissue, these products are reabsorbed and carried by a centrifugal

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flow of lymph into the circulation. If, on the other hand, we put a foreign body such as a rubber drain into the abdominal cavity after the operation the local irritation of this foreign body causes (as can be shown experimentally) a reversal of the lymph stream and reabsorption is checked. This is why I do not advise primary closure where there is extensive necrosis and destruction of the serous membranes, as in infections with *Bacillus coli*.

To summarise: (1) The technique of, and indications for, electrosurgical destruction of the gall-bladder have been developed exhaustively since 1924 by my co-workers and myself. (2) In the majority of the thousand cases treated, destruction of the gall-bladder (mucoclasis) with preservation of the serous membranes has proved the most satisfactory procedure. Where the function of the gall-bladder is still good and exploration shows only stones without severe inflammation of the walls we prefer to preserve the whole gall-bladder and perform a cholecysto-choledochostomy. (3) In cases of phlegmonous inflammation with abscess-formation total destruction of all the coats of the gall-bladder by electrocoagulation may be necessary. Careful destruction of all abscesses deep in the liver is of the greatest importance. (4) No rigid procedure is advisable, but the depth of electrocoagulation must be adapted to special cases. (5) Usually no drainage is required after electrocoagulation, but in cases badly infected, especially with *B. coli*, a drain will act as a foreign body and reverse the lymph stream, thus preventing too quick a reabsorption of toxic products. (6) Electrosurgical operations on the gall-bladder have considerably lowered the mortality and shortened the time of recovery.

I am, Sir, yours faithfully,

B. O. PRIBRAM,
Director, Surgical Department, St. Hildegard Hospital, Berlin.

March 14th.

HOSPITAL LIBRARIES ABROAD

To the Editor of THE LANCET

SIR,—In various official capacities it has fallen to my lot to collect information about hospital libraries in all countries in which they exist, and I cannot agree with your statement (Feb. 12th, p. 414) that the value of books to patients has not received the same recognition in this country as in some others. Actually it has received more, but here the *method* of establishing the libraries has been different. There is, I think, no country in the world in which so many of *every* type of hospital (with the exception of some of the infectious hospitals) is supplied with books—over 2000 hospitals in all. The large majority of these are supplied by the British Red Cross Society and Order of St. John Hospital Library, and the remainder by the Library Association, Toc H, or by individual hospitals themselves. These three organisations are in close coöperation with each other. Amongst these hospitals an increasing number have librarians, most of whom are voluntary, but wherever possible tuition, at a training centre and failing that in writing, is given to the head librarians.

Where a library service has developed as quickly over a national field the standard cannot be as uniformly high as it is where libraries are opened up slowly, hospital by hospital. Reports of American hospital libraries show that many of them are excellent; some have new, others second-hand books; some have professional, others voluntary librarians. Some of the libraries in the Paris hospitals are a joy to see; they have been able to acquire special funds for the purpose.

The immediate problem is where in countries where most of the hospitals are municipal, magnificent libraries such as those in France and America (and also Brussels) can be developed and maintained for all hospitals within a reasonable period of time. And the question arises whether it is better to leave many thousands of hospital patients without books at all until first-class libraries can be started; or to try, by some means or other, to provide books for all hospitals quickly, and then to set about improving the standard. The International Guild of Hospital Librarians advocates the latter method—provided always that second-hand books are in good clean condition—and it is fair to recall that in some countries the hospital library movement owes its activity to the efforts of the Guild. Once hospital and public library authorities regard libraries for patients as *essential* the rest will follow, each country working out a plan best suited to its needs.

I am, Sir, yours faithfully,

MARJORIE E. ROBERTS,
Hon. Secretary, International Guild of Hospital Librarians.

48, Queen's-gardens, W.2, March 22nd.

A RECTAL PLUG FOR PILES

To the Editor of THE LANCET

SIR,—In reply to Dr. Poulton the rectal plug which I described in your issue of Jan. 15th was made by Messrs. Down Bros., and is similar to his, but has a smaller end. My next step has been to ask a firm to make a plaster impregnated with a substance with delayed melting properties in which is incorporated 2 per cent. of silver nitrate for its sclerosing action on the hæmorrhoidal sinus. This plaster is applied around the neck of the plug and can be renewed as often as necessary. Thus we have a continuous medicinal therapy to an area impossible to treat by unguenta, along with continuous pressure exerted by the anal sphincter on the hard neck of the plug. Together this may help to solve a distressing and difficult problem.

I am, Sir, yours faithfully,

Hastings, March 21st. E. F. ST. JOHN LYBURN.

A FACTOR IN FLATULENCE

To the Editor of THE LANCET

SIR,—In his remarks on flatulence reported in THE LANCET of March 5th (p. 553) Prof. Henry Cohen omitted the mention of what must surely be the most important factor, at any rate as far as the intestine is concerned. If carbon dioxide is produced by the neutralisation of a carbonate and hydrochloric acid and this gas gets inside the intestine, or if the carbon dioxide results from fermentation in the intestine, the latter must act as an aerotonometer so that nitrogen and oxygen diffuse into it from the tissues until there is approximate equilibrium, in other words until the mixed gases contain about 7 per cent. carbon dioxide, 5 per cent. oxygen, and 88 per cent. nitrogen,[1] a sevenfold increase of volume. The principle is of course the same as the change which takes place in a pneumothorax after the introduction of air, and would not require more than two or three hours. The reabsorption of the mixed gases will then depend upon their total pressure in the intestine being greater than their total pressure in the tissues, and since nitrogen diffuses more slowly than the other gases, owing to its low solubility and the

[1] Campbell, J. Argyll, and Poulton, E. P., Oxygen and Carbon Dioxide Therapy, London. 1934. Fig. 3, p. 10, and addendum, p. 190.

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high concentration in the atmosphere, the reabsorption will mainly depend on the rate at which this gas disappears. This change in the composition of a gas associated with the slowing down of absorption has been called by Krogh "a sliding equilibrium." Its rate is eventually as slow as after an artificial pneumothorax, but would be facilitated if the patient was placed in a reasonably air-tight oxygen tent with a high percentage of oxygen, because the nitrogen would more rapidly diffuse out through the pulmonary epithelium into the air of the tent. Mr. Zachary Cope himself referred to this work of J. Fine and his co-workers. This method ought to be tried more often, especially after surgical operation.

I am, Sir, yours faithfully,

E. P. POULTON.

Upper Wimpole-street, W., March 21st.

HEARING-AIDS FOR DEAFNESS

To the Editor of THE LANCET

SIR,—As one who has suffered from a gradually increasing deafness of the middle-ear type for the past twelve years I would like to put at the disposal of my colleagues my experiences with various hearing aids. I propose referring to the degree of deafness in three stages, together with the measure of relief afforded by certain aids.

Ten years ago the deafness was only noticeable when conversation was kept low, and when the hearing conditions of a hall or theatre were poor. I would not recommend any aid for this stage.

Six years ago ordinary conversation had to be clear to be heard, and at meetings I had to obtain a seat near the speaker. I tried various electrical aids and found them useless. A six-inch Banjo trumpet was of real help at lectures. For this stage the simple electrical aid would probably be the instrument of choice to-day.

At the present time I can only hear conversation at five feet if the speaker raises his voice considerably. I can just manage the telephone if the line is good. All ordinary undertakings are handicapped by the obvious fact that one is "very deaf." When I had reached this stage the simple electrical aid gave me comparatively little assistance, and I was becoming resigned to the inevitable, when I was given an opportunity of trying a valve aid last summer. To my astonishment I found that I could hear all ordinary quiet conversation, and that at meetings and dinners auditory conditions had to be very bad if I was unable to hear distinctly.

I tested a number of different makes, fitted with both carbon and crystal microphones, all except one having an air-conduction receiver. In every case I could hear well, but there was considerable variation in the pleasantness of the tone, especially in music. The one exception was arranged for bone conduction, and I found that I could hear slightly better with this aid than with any of the others that I tested; further, the reception was particularly pleasant. This model was recently introduced to this country by an American firm, and is of the size and shape of a postcard roll film camera. I have worn this aid every day for the past three months, and have experienced none of the uncomfortable pressure effect referred to in a report issued by the Medical Research Council on the testing of hearing aids.[1] I understand, however, that there was no satisfactory valve aid fitted with bone conduction on the market at the time this report was drawn up. When laboratory tests can be made between valve aids with bone conduction and valve aids with air conduction, it seems likely that the value of bone conduction as a system of hearing may prove to be greater than previous tests indicated.

In conclusion, I would quote the old saying that the proof of the pudding is in the eating. Never allow anyone to purchase an aid until he has had an opportunity of testing it fully, under the conditions which usually occasion the greatest difficulty in hearing.

I am, Sir, yours faithfully,

Ipswich, March 15th. C. H. C. DALTON.

[1] *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 219, iv.

OBITUARY

ARCHIBALD WILLIAM CUFF, M.B. Camb., F.R.C.S. Eng.

Mr. Archibald Cuff, who died on March 9th at the age of 69, after a long illness, received his professional education at Cambridge and St. Thomas's Hospital. In 1895 he was appointed house physician to the Sheffield Royal Infirmary and in 1898 joined Dr. G. E. K. Thorpe in his practice in Sheffield. Later he became honorary surgeon to the Royal Infirmary and during his 30 years there helped to lay the foundation of modern abdominal surgery. On his retirement he was elected to the board of management. He was a sound and reliable surgeon, calm and deliberate, and opposed to adventurous and ill-digested methods. He was an omnivorous reader and among his many-sided interests included conjuring, painting in water colours, and the collection of china and glass. He was lecturer in surgery at Sheffield University and an examiner at Cambridge, and during the war served as medical officer with the R.F.A. on the western front. He leaves a widow and two daughters.

THE LATE SIR RAYMOND CRAWFURD

Dr. Charles Newman writes: "Many men of this, and probably of preceding, generations will find they have lost a very great friend in Sir Raymond Crawfurd. He was one of those exceptional people who are not only ready at any time to give advice and assistance to those who ask it; he went out of his way to seek opportunities to be of use to others. He once said that the reason he enjoyed teaching medicine was that it gave so many occasions for helping students, especially the average man, who could benefit so enormously from that kind of assistance, of which the brilliant student stood in no such need. This attitude was strongly expressed in his teaching: he had a genius for teaching the simple and important things, which so many make dull and tedious, in an interesting and intelligible way. . . .

"He was very like Thomas Hardy in his attitude to human failings. Beneath his interest in the foibles and weakness of his fellows there lay, not a feeling of superiority or of scorn, but a kindly pitying tolerance and a great humour. Without some degree of acquaintance, it was easy not to appreciate that this dignity and meticulous scholarship were mixed with many other qualities: a great love of the countryside, of birds and of all natural beauty, a delicate sensitivity to ugliness of all kinds, and that excitement about football which ultimately cost him his life. Those who came to know him were often surprised by the youthful receptiveness of Sir Raymond Crawfurd's mind; his willingness to consider with sympathy any idea, however new. Everyone appreciated his

(*Continued at foot of opposite page*)

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PARLIAMENTARY INTELLIGENCE

THE INFANTICIDE BILL

LORD DAWSON'S PROPOSALS

IN the House of Lords on March 22nd Viscount DAWSON OF PENN moved the second reading of the Infanticide Bill. Its intention, he said, was to secure recognition by Parliament that in certain circumstances the killing of infants was provoked by illness and not always by criminal intent, and to procure for such cases appropriate handling. The subject had vexed the minds of both lawyers and the public for 70 years. The common sense of the public had detected that among these cases of child murder there were two groups: a childbirth group and a group which constituted the murdering of unwanted children. Yet both were tried for murder and condemned to death alike. In course of time public feeling became so moved that juries refused to convict, and that led to a certain number of guilty people escaping punishment for murder.

In 1861 a Bill was passed which provided a loophole and created the offence of concealment of birth. Then juries got out of their difficulties by finding the defendants innocent of murder but guilty of concealment of childbirth, with the result that a number of people escaped who ought not to have done so. Finally, in 1909, a Bill was passed through the House of Lords, of which Lord James of Hereford was the substantial author, which provided that should a judge think proper he could direct the jury to acquit the woman of murder and to convict her of manslaughter, the sentence being left to the judge. In 1922 a more far-seeing measure was brought forward by the late Mr. Arthur Henderson, which after amendment in the House of Lords, became the Infanticide Act of 1922. That Act provided that in cases where at the time a mother caused the death of her child she had not fully recovered from the effects of giving birth to a child and the balance of her mind was thereby disturbed she would be guilty of manslaughter. But there was no definition in that Act of what was meant by a "newly born" child.

The hardship of these cases was that women, who were in many instances innocent, might be faced with the prospect either of being convicted of murder or of being sent to Broadmoor and of being stamped with insanity. The term "newly born" had been omitted from the present Bill and a time limit of a year had been inserted. The Bill gave a jury power to bring in a verdict of infanticide on their own initiative. When a defendant appeared in a court of first instance it was neither fair nor necessary that she should be remanded to prison. Where possible bail should be allowed, but where that was not possible the woman should be remanded to a hospital or to a home. In a large proportion of these cases there was a complete recovery. Forty-two per cent. of the female admissions to Broadmoor were there for child destruction, and of these 50 per cent. recovered. It was an unfortunate thing that those women should have the Broadmoor stamp; they should be treated as cases of illness.

It was necessary, Lord Dawson agreed, to be careful that a means of escape was not provided for the murderer of the unwanted child and it was for that reason that he had inserted the limitation of one year. It was rare to find cases of insanity following childbirth which did not recover within a year. The Bill implied that certain offences could be due to mental illness, and when that illness amounted to irresponsibility for the offences charged the patient should neither be punished nor dubbed as a lunatic but should be bound over for appropriate treatment. It would be a practice more in harmony with present-day thinking and sound humanity.

GENERAL SUPPORT

Lord SNELL said that the Labour peers gave the Bill their general support, but if one of these women was to be sent to a hospital they wanted to know what sort of hospital it should be. A criminal lunatic asylum, of course, was not the right place; nor was a mental hospital. It was true that in a mental hospital a patient had the advantage of specialised treatment, but sometimes some kind of certification was necessary. Certification of insanity should not be carried out if it could be avoided.—The Marquess of CREWE, in supporting the Bill, said that no doubt the points raised by Lord Snell would receive full attention in Committee? Support for the Bill was also expressed by Lord ATKIN and the Archbishop of CANTERBURY.—Lord ARNOLD suggested that consideration should be given to the extension of the Bill to cover cases where there was mental disturbance due to distress and despair arising from solicitude for the child, or extreme poverty, or either of these.

THE GOVERNMENT'S HESITATION

The Earl of MUNSTER, Lord-in-Waiting, said the term "newly born" had been criticised on the ground that it was indefinite. In cases where a verdict of infanticide was returned the death of the child generally occurred within the first few hours of birth, and he was advised that the courts had had no difficulty in interpreting the term. The question for how long a period childbirth might have a disturbing effect on the woman's mental balance was a medical question; in exceptional cases the effects might be long and possibly lasting. But in practice it was necessary to have regard to what was normal and unless the Bill was framed to deal with exceptional cases was it right, he asked, to fix the period at twelve months? Would not some shorter period cover the generality of cases? The result of fixing the period at all would be that in one case a woman would be liable to be convicted of murder because the child was just over the age-limit, and in another she would be convicted of infanticide because the child was just under the age-limit. How far would the substitution of a time-limit of twelve months for the term "newly born" result in an increase in the number of verdicts of infanticide? Since 1930 there had, he said, been 13 women reprieved after conviction for child murder. One killed an imbecile son aged 30, and one a daughter aged 8. Four killed children whose ages ranged from 12 to 20 months. In six of those cases the Bill would have had no effect whatever. In the case of the seven remaining women who killed children ranging from 1 to 9 months old there had been no suggestion that the mother's mind was still unbalanced by the effects of childbirth. This did not suggest that the effect of this Bill would be to substitute verdicts of infanticide for verdicts of murder in any considerable number of cases. The Government would however be prepared to give the Bill careful consideration in committee.

Lord DAWSON said that when this question was first brought up after a very painful case at the Central Criminal Court, he did not go into the matter in his personal capacity but took care, as president of the Royal College of Physicians, to refer it to a committee of experts. The conclusions he had put forward were their considered opinion. When their report was in his hands he brought it to a gathering of leading K.C.s and medical men, and there was

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ripe wisdom, the product of a fine mind endowed with many years of experience. He was a great registrar of the College of Physicians, and many of us will never enter the censors' room without thinking of him; the room which he said was the most beautiful in London, quiet yet in the hub of the capital, with its panelled walls and fine portraits, where from his seat he could see nothing, within or without, less than 100 years old."

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general agreement about it. Infanticide, happily, was not a common thing. The Bill dealt with quality rather than quantity. He was aware of the figures which Lord Munster had quoted, but he was assured that cases of insanity delayed until the period of lactation were far more numerous than he had imagined.

The Bill was read a second time.

NOTES ON CURRENT TOPICS

Naval Marriage Allowances

IN the House of Commons on March 14th Mr. SHAKESPEARE, Parliamentary Secretary to the Admiralty, announced that a scheme of marriage allowances to officers of the Royal Navy and Royal Marines had been approved to operate from April 1st next. On introducing the Navy Estimates for 1938 on March 17th Mr. SHAKESPEARE said that it had been found necessary to reserve for further consideration the applicability of the present scheme of marriage allowance, with or without special modification, to the medical branch. He fully sympathised with the natural disappointment which all R.N. medical officers would experience when they heard that statement, but every effort was being made to arrive at an equitable arrangement at a very early date.

In the House of Lords on March 16th the Poor Law Amendment (No. 2) Bill was read the third time and passed. On March 17th in the House of Lords the National Health Insurance (Amendment) and Superannuation (Various Services) Bills passed through committee. A motion was agreed to referring the Collecting Charities (Regulations) Bill to a committee of both Houses. On March 18th the Housing (Financial Provisions) Bill passed through its remaining stages in the House of Commons and was read a first time in the House of Lords.

In the House of Lords on March 21st the Middlesex Hospital Bill was read a second time.—On March 22nd the National Health Insurance (Amendment) Bill was read the third time and passed. The Housing (Financial Provisions) Bill was read a second time.

QUESTION TIME

WEDNESDAY, MARCH 16TH

Deaths on a Liner

Mr. TEMPLE MORRIS asked the President of the Board of Trade whether any report had been received by his department as to the cause of the recent deaths on board the liner *Llanstephan Castle*.—Captain WALLACE, Parliamentary Secretary to the Board of Trade, replied: Yes, Sir. Three members of the crew are certified to have died in Port Sudan hospital on Feb. 13th, 14th, and 16th of malignant malaria. Another member of the crew died on board the vessel on Feb. 8th and the primary cause of his death is stated in the log to have been amœbic dysentery. As a result of his inquiry into this death, the superintendent of the Mercantile Marine Office has endorsed the log to the effect that there is not sufficient evidence available to enable him to say whether the statement of the cause of death in the log is in his opinion true or not.

Nutrition in Ceylon

Mr. SORENSEN asked the Secretary of State for the Colonies whether he was aware of the recent report on nutrition in Ceylon; and what action was being taken to improve nutrition and diminish mortality and ill health.—Mr. ORMSBY-GORE replied: Yes, Sir; two reports on this important subject have been published in the last year. As regards the second part of the question, it would be impossible to compress within the limits of a parliamentary answer the measures which are being taken by Ceylon ministers to improve nutrition. But as an instance of the great importance which I know ministers in Ceylon attach to the subject (it is one which under the constitution falls wholly within their competence) I may add that a sum of Rs.1,000,000 has been voted this year for providing meals for school-children.

Mr. T. WILLIAMS: Is the right hon. gentleman aware that it was generally the opinion of medical officers in Ceylon that the absence of resistance when the malaria epidemic overtook them trebled the death-rate.

Mr. ORMSBY-GORE: That certainly was the opinion expressed by a great many medical officers. No doubt this is a matter which the responsible ministers in Ceylon take into account.

Pay Deductions for Hospital Funds

Mr. ROBERT GIBSON asked the Secretary to the Treasury if the decision of the Admiralty under which Admiralty industrial employees not covered by existing contributory schemes might arrange for contributions to local hospital funds by means of deductions from their pay was to be extended to all industrial employees of the Government; and, if so, what services would be affected and how many workers in each service.—Colonel COLVILLE replied: The intention is that the scheme of deductions from pay for hospital purposes through a central organisation should be made available to all industrial staffs at home directly employed by the Government provided, of course, that the bodies to whom contributions are desired to be made elect to coöperate with the central organisation. As the hon. Member will appreciate, time may be taken in setting up the necessary machinery, the details of which are under discussion with the British Hospitals Contributory Schemes Association. The number of industrial employees of Government Departments on April 1st, 1937, was 173,000.

THURSDAY, MARCH 17TH

Hospitals and Air-raid Precautions

Colonel NATHAN asked the Home Secretary what directions it was proposed to issue, and when, for the information of the main hospitals and the special hospitals in London as to what steps they should take for the protection of their patients, staff, and buildings against injury by air-raids, and as to what was expected of them, respectively, in the event of an air-raid.

Mr. GEOFFREY LLOYD, Under-Secretary, Home Office, replied: This matter presents difficult problems. As regards the first part of the question a handbook on such structural precautions as are practicable is in an advanced stage of preparation and will be available shortly. On the last part, a survey of the position of the hospitals in London is being made by the Ministry of Health and the medical authorities.

Colonel NATHAN: Is the hon. gentleman able to say what the committees of hospitals, which at present are completely without information and quite unable to obtain guidance, should do to discharge their responsibilities towards their patients and their staffs?

Mr. LLOYD: This handbook will be available shortly, and in the meantime we shall be glad to advise any hospitals.

Mr. KELLY: Does that survey include mental hospitals as well as general hospitals?

No further answer was given.

Commitment of Children to Prison

Mr. HARVEY asked the Home Secretary what action was taken in the case of the 15 boys and three girls who were received into prison in 1936 without any certificate of the court, in accordance with the provisions of the Children and Young Persons Act of 1933; and whether he would issue instructions that in future no boys and girls under 17 years were to be received into prison without such a certificate in each case.—Sir SAMUEL HOARE replied: Prison Governors have instructions to bring any such cases immediately to my notice. In three of these eighteen cases the court was prepared to issue the necessary certificate; two cases were girls who reached the age of 17 while on remand; in nine cases the period of remand was so short (in some cases for one night only) that no action could be taken; in the remaining four cases three boys and one girl were removed to Remand Homes. As regards seven of the eighteen cases five boys and two girls had told the court that they were over 17 and their true ages were not discovered till after they had been received into prison.

Mr. HARVEY: Can instructions be given to governors

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of prisons to refer cases of this kind to remand homes when they know the ages of the children concerned?

Sir S. HOARE: Yes, Sir. Due instructions are being issued to prison governors that they are not in future to receive anybody under the age of 17 into the prison unless the document accompanying the prisoner authorises them to do so.

Physical Training and Recreation

Sir SMEDLEY CROOKE asked the Parliamentary Secretary to the Board of Education what action had been taken by the National Advisory Council for Physical Fitness to carry out the Government's declaration that the Physical Training and Recreation Act was designed to help those who were desirous of obtaining facilities for physical exercise but who were not well off and without initiative; and what inquiries had been made amongst members of junior football clubs, or similar small athletic clubs, to ascertain their desires and supply their wants.—Mr. KENNETH LINDSAY replied: In considering applications for grant, and in assessing the amount of grant, in aid of facilities to be paid by the Board, the Grants Committee invariably pay close attention to the economic circumstances of the area or of the particular applicant organisation. As regards the second part of the question it is one of the statutory functions of area committees to review the existing facilities and to survey the needs of their areas and my noble friend has no doubt that in the course of this survey clubs and organisations of every sort will have ample opportunity of making known their own particular needs.

Flooded Houses in Norfolk

Sir THOMAS COOK asked the Minister of Health what steps were taken by the local authority to ensure that its medical officer of health inspected property which was inundated as the result of the recent abnormal high tide in the parish of Cley, Norfolk; when was the visit made; and what was the result of the report received.—Sir KINGSLEY WOOD replied: I understand that the medical officer of health visited Cley on Feb. 14th immediately after the flood water had subsided. Neither he nor the sanitary inspector, who subsequently visited the village on several occasions, found any reason to suspect any danger to public health.

MONDAY, MARCH 21ST

Where People Die

Mr. RHYS DAVIES asked the Minister of Health the proportion of persons who died at their own homes in this country and those in institutions, respectively.—Sir KINGSLEY WOOD replied: The latest information available is that published in Appendix B of the Registrar-General's statistical review, Part I, for the year 1930, which shows the aggregated figures for the years 1926–30. The figures and percentages are as follow:—

	Deaths by place of occurrence, England and Wales 1926–30.	
	No. of deaths.	Per cent.
Deaths in institutions	780,529	32·7
Deaths elsewhere than in institutions	1,606,192	67·3
	2,386,731	100·0

Vaccination

Mr. GROVES asked the Minister of Health if he would supply the following particulars for each of the last five years for which complete figures were at present available: the number of public vaccinations and revaccinations; the expenditure of local authorities on vaccination; and the expenditure on the Government lymph establishment.—Sir KINGSLEY WOOD replied: The information desired by the hon. Member is as follows:—

1. Public vaccinations and revaccinations (England and Wales):

Year ended—Sept. 30th	Public vaccinations.	Revaccinations.
1932	207,543	16,624
1933	189,857	9,628
1934	184,137	14,802
1935	183,917	9,267
1936	176,618	11,434

2. Net expenditure on vaccination of all local authorities (England and Wales):

1931–32	..	£146,714	1934–35	..	£125,646
1932–33	..	£136,365	1935–36	..	£126,775
1933–34	..	£128,339			

3. Net expenditure of Government lymph establishment:

1932–33	..	£12,583	1935–36	..	£12,363
1933–34	..	£11,752	1936–37	..	£12,069
1934–35	..	£11,492			

TUESDAY, MARCH 22ND

Compulsory Notification of Measles

Mr. DAY asked the Minister of Health whether his attention had been drawn to the fact that, during the ten years from 1927 to 1936, there was an annual average of 527 deaths from measles in London alone; and, with a view to preventing any infectious disease becoming widespread, would he utilise his powers under the Public Health Act, 1936, to make regulations rendering all cases of measles compulsorily notifiable on a uniform basis.—Sir KINGSLEY WOOD replied: The answer to the first part of the question is in the affirmative. With regard to the last part, this matter has recently been under consideration by the London County Council and I have informed them that I should be prepared to entertain an application for the making of regulations in regard to the notification of measles in London.

Vermin in Ships

Sir WALTER SMILES asked the Minister of Health how many British steamers inspected by the Cardiff port sanitary authority during the past year were found to be vermin-ridden.—Sir KINGSLEY WOOD replied: I am informed by the port health authority that the number was 114.

Births, Marriages, and Deaths

BIRTHS

FOX.—On March 16th, at Hove, the wife of Dr. Frank W. W. Fox, Colonial Medical Service, Nigeria—a son.

PASMORE.—On March 18th, at Chepstow Villas, W., to Dr. Jean and Dr. Stephen Pasmore—a daughter.

WILLIAMS.—On March 16th, the wife of Mr. H. Morgan Williams, F.R.C.S., of Parkstone—a daughter.

MARRIAGES

LEECH—JACKSON.—On March 19th, at William Parish Church, Letchworth, Ralph Bosdin Leech, M.R.C.S., of Sevenoaks, to Bertha Newsom Jackson, of Letchworth.

MACGREGOR—SIMPSON.—On March 19th, at Holy Trinity, St. Marylebone, Dr. Murdoch MacGregor, of Exeter, to Lilian Simpson, of The White House, Regent's Park.

DEATHS

BAILEY.—On March 18th, R. Cozens Bailey, M.S. Lond., F.R.C.S. Eng., of Hazelwood, East Cowes, aged 70.

BENSLEY.—On March 16th, at Cookham Dean, Lieut.-Colonel Charles Norman Bensley, M.B., C.M. Edin., I.M.S. (retd.), aged 74.

BIRT.—On March 18th, at Sydenham, Colonel Cecil Birt, M.R.C.S. Eng., A.M.S. (retd.), aged 78, the last surviving child of the late Dr. Thomas Birt, of Leamington Spa.

CLOGG.—On March 17th, at Nuffield House, Guy's Hospital, Arthur Henry Clogg, L.D.S. R.C.S. Eng., of Upper Norwood and Harley-street.

GIBBS-SMITH.—On March 15th, Edward G. Gibbs-Smith, M.D. Durh., D.P.H., of South Kensington.

GRIFFIN.—On March 17th, at Southampton, Frederick Thresher Griffin, M.B., C.M. Edin.

KINGSBURY.—On March 14th, at Blackheath, George Chadwick Kingsbury, M.D. Dubl., barrister-at-law.

PHILLIPS.—On March 21st, John Robert Parry Phillips, O.B.E., M.R.C.S. Eng., of Kingsdown, Box, Wiltshire.

QUAYLE.—On March 16th, at Budleigh Salterton, William Adair Quayle, M.D. R.U.I., Colonel, I.M.S. (retd.), aged 82.

ROSE.—On March 21st, at The Woolavington Wing, Middlesex Hospital, Thomas Rose, M.R.C.S. Eng., in his 67th year.

TOLAND.—On March 14th, Charles Kirk Toland, M.D. Glasg., of Ullesthorpe, Rugby, aged 63.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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MEDICAL NEWS

University of Oxford

Mr. G. R. Girdlestone, Nuffield professor of orthopædic surgery, has been elected to a supernumerary fellowship at New College.

University of London

At the second annual conversazione, held on March 17th, graduates and their friends took the opportunity of seeing progress in the building scheme. Guests entered through the base of the tower which was flood-lighted but not otherwise accessible, and the libraries on the fourth floor were part of the exhibit. During the evening members of the administrative staff twice performed an abbreviated version of a musical play in five acts entitled "A China Rose," and serious musical entertainment was provided by students of Trinity College of Music.

University of Sheffield

At recent examinations the following candidates were successful:—

FINAL EXAMINATION FOR THE DEGREES OF M.B., CH.B.

Parts II and III.—G. E. Wright (with second class honours), A. K. Beardshaw, R. B. Davies, H. D. Elliott, W. L. Rose, and J. W. Wier.

University of Liverpool

At recent examinations the following candidates were successful:—

D.M.R.E.

Part A.—G. E. Church, N. A. Lawler, W. Niven, and F. Pygott.

D.P.H.

Part I.—S. Ball, A. Cathcart, A. B. Concanon, L. R. L. Edwards, A. J. Gill, A. L. Smallwood, and Margaret C. Winter.

D.T.M.

F. Bastawros, P. J. Bourke, O. Einstein, N. Q. Hesse, F. Jacusiel, K. Jilani, J. Kay, E. Kohlschütter, J. L. Lanceley, and B. Nyan.

D.T.H.

J. L. Dales and V. G. Patwardhan.

Dr. J. Kay was recommended for the Milne medal.

Congress of Thalassotherapy

The International Association of Thalassotherapy will hold its eighth congress at Montpellier-Palavas from June 3rd to 6th. The principal subjects for discussion will be tuberculous peritonitis, and the meteorological factors of the sea climate. Further information may be had from the secretary of the association, 8 rue André Michel, Montpellier, France.

Royal Society

The following have been elected to the fellowship of the society: G. D. Bengough, consultant to the chemical research laboratory, Department of Scientific and Industrial Research; C. H. Best, professor of physiology, University of Toronto; W. Brown, professor of plant pathology, Imperial College of Science and Technology; J. W. Cook, professor of chemistry, the research institute, Royal Cancer Hospital; T. L. Eckersley, research physicist, Marconi's Wireless Telegraph Company; G. I. Finch, professor of applied physical chemistry, Imperial College of Science and Technology; W. E. Gye, director of the laboratories of the Imperial Cancer Research Fund; W. V. D. Hodge, Lowndean professor of astronomy and geometry, University of Cambridge; J. S. Huxley, secretary of the Zoological Society of London; J. Jackson, H.M. Astronomer at the Cape; Sir Robert Mond, chemist and Egyptologist; J. E. Richey, district surveyor, H.M. Geological Survey; F. S. Russell, naturalist at the Marine Biological Association; B. F. J. Schonland, professor of physics, University of Cape Town; F. S. Sinnatt, director of fuel research, Department of Scientific and Industrial Research; K. M. Smith, senior research assistant, Plant Virus Station, Cambridge; E. Stedman, lecturer in department of chemistry in relation to medicine, University of Edinburgh; C. E. Tilley, professor of mineralogy and petrology, University of Cambridge; W. E. S. Turner, professor of glass technology, University of Sheffield; and H. H. Woollard, professor of anatomy, University College, London.

THE King has given Dr. Hugh Stannus, senior physician to the French Hospital, London, permission to wear the insignia of Chevalier Legion d'honeur conferred upon him by the French Government.

North-Western Tuberculosis Society

Mr. J. E. H. Roberts will read a paper in the physiology theatre of the medical school of Manchester University, on Thursday, March 31st, at 3.15 P.M., on the surgical treatment of pulmonary cavities. Medical practitioners are invited to attend.

St. Mary's Hospital

Under the will of Mr. Frank Lindo, who as an "anonymous donor" gave generously to the hospital during his lifetime, his house and gardens at Adair Lodge, Aldeburgh, will now pass to the hospital as a rest and convalescent home for its nurses. Mr. Lindo also bequeathed the sum of £25,000 for the upkeep of the home.

West London Medico-Chirurgical Society

The discussion on recent advances in rheumatism which was being held by this society on April 1st has been postponed. It will take place at the De Vere Hotel, Kensington, at 7.45 P.M., on April 8th, and the speakers will include Dr. J. F. Halls Dally, Dr. W. S. C. Copeman, and Dr. C. B. Dyson.

Children's Minimum Council

On March 30th Lord Horder will take the chair at a luncheon which is being held by this council in the refectory of the London School of Economics at 1 P.M. The menu will be based on the diet recommended by the B.M.A. nutrition committee in 1933 as the minimum necessary for health, and the wife of an unemployed man will describe how she actually balances her budget. Tickets for the luncheon may be had from the secretary of the council, 72, Horseferry-road, London, S.W.1.

Society of Public Analysts

The next meeting of this society will be held on Wednesday, April 6th, at the chemical society's rooms, Burlington House, Piccadilly, London, W., at 8 P.M. Mr. H. E. Cox, D.Sc., will read a paper on the chemistry and analysis of hernia, Miss Janet Matthews, Ph.D., on microchemical investigations on siliceous dusts, and Mr. W. D. Raymond on the detection and determination of ouabain and strophanthin.

St. Mark's Hospital

At the annual meeting of this hospital on March 17th the Lord Mayor of London, who presided, said that the nurses' home was nearing completion, and would be opened by the Princess Royal on May 5th. It was proposed to convert the space vacated in the hospital by the nurses into a self-contained block for paying patients, and to provide a second operating theatre and additional public beds. The pathological, cancer research, X ray, and out-patient departments would also be enlarged and brought up to date. The cost of this work would be approximately £50,000, half of which had already been received or promised, and an urgent appeal was being made so that the work would be completed free of debt. Mr. L. E. Norbury, honorary surgeon to the hospital, said that the waiting list of patients was the longest in his recollection of the hospital, and amounted to some 400. The greatest care, however, was taken not to keep a cancer patient waiting, and all but one of the 400 were non-cancer cases. The annual report stated that during last year just upon one thousand patients had been admitted to the hospital, and 1115 operations performed. For carcinoma of the rectum 142 cases were admitted, nine of which were readmissions for recurrence. The operability rate was 64·3 per cent. Of the operations, perineo-abdominal excision was performed in 59 cases, perineal excision in 19, and abdomino-anal excision in 2. Of carcinoma of the colon 19 cases were admitted, 10 of which were operable.

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Naval Medical Compassionate Fund

A meeting of the subscribers of this fund will be held at 3.15 P.M. on April 22nd, at the medical department of the Navy, Admiralty, S.W., to elect six directors of the fund.

Society of Apothecaries

On March 22nd at a dinner of the court of assistants Mr. Montagu Norman presented to the society on behalf of the Bank of England a silver cup to commemorate the mastership of Dr. Arthur Gibbons, who for 18 years has acted as medical officer to the bank.

Royal London Ophthalmic Hospital, Moorfields

The annual dinner of the Royal London Ophthalmic Hospital took place on March 10th at the Langham Hotel, with Mr. A. C. Hudson, consulting surgeon to the hospital, in the chair. In responding to the health of the School the dean, Mr. Charles Goulden, remarked on the flourishing state of the school, the entries being even larger than in 1936. In the year ended October, 1937, 114 new students had been admitted and 77 old students had continued their attendance, besides which instruction had been provided for students from the British Postgraduate Medical School. The examination results had been satisfactory. In the first part of the D.O.M.S., 40 of the 48 successful candidates were Moorfields students, and of the 53 who passed the final examination 43 came from Moorfields. There were 18 entries for the D.O. Oxford, and of the 9 who were successful 8 were students of the hospital. The dean again drew attention to the urgent need of ophthalmology being placed in its proper position in relation to the other branches of medicine by the foundation of a professorship and a suitable team of helpers. Until this was done it was impossible to achieve more in the direction of teaching and training.

Post-graduate Course in Preventive Treatment

With the coöperation of the British Postgraduate Medical School the London Panel Committee in conjunction with the London Public Medical Service has organised a post-graduate course in preventive treatment. The course will consist of six lectures which will include discussion of the following subjects: the prevention and early recognition of skin disorders; the rôle of diet in the causation of disease; postural defects and minor orthopædic complaints; prevention, recognition, and treatment of early tuberculosis; running ears and infected sinuses in children. The lectures will be given at the British Postgraduate Medical School, Ducane-road, W.12, on April 7th, 14th, 21st, 28th, May 5th and 12th at 3 P.M. The fee will be one guinea. A preliminary lecture will be given by Dr. Harry Roberts at B.M.A. House, Tavistock-square, W.C., on March 30th, at 3 P.M., which will be open free of charge to all insurance practitioners in London and members of the London Public Medical Service. The lecture will summarise the course and a discussion will follow on the preventive aspect of medical practice. Those who propose to attend either the course or the lecture should write to Dr. C. L. Batteson, 17, Russell-square, London, W.C.1, as soon as possible.

The Medical Superintendents' Society

Dr. W. D. Feldman presides this year over the society and took the chair at the annual dinner held on March 19th at the Langham Hotel, London, W. Dr. James Fenton, president of the Society of Medical Officers of Health, proposed the toast of the Society. He called attention to the remarkable improvement made during the last 10 or 12 years in municipal hospitals where the work done was now equal to if not sometimes better than that in voluntary hospitals. Whereas the voluntary hospitals of London owned 13,000 beds, there were 100,000 under municipal control. Voluntary hospitals were more in the limelight because they had to devise means to procure funds which in municipal hospitals were provided by ratepayers. In general it could be said that whatever was needed for the diagnosis and treatment of patients in these hospitals could be obtained without difficulty. Vast opportunities for fruitful research presented themselves in municipal hospitals, and it was to be hoped that advantage would be taken of them. Close association between the society and that of the medical officers of health was desirable and the arrangement of joint meetings would help to promote good understanding. The president in response welcomed the suggestions for coöperation. The privilege of teaching students had now been extended to municipal hospitals to the great advantage of all parties to the arrangement. Dr. H. O. West proposed the toast of the visitors in graceful terms and Dr. D. C. Norris, president of the Hunterian Society, responded with a tribute to the energy and imagination with which the reform of the municipal hospitals had been carried out. Between the speeches Mr. Finlay Dunn and Mr. Victor Peacock entertained the company, whose enjoyment of the friendly domestic atmosphere of the dinner party was evident.

Medical Diary

March 28th to April 3rd

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY.

Odontology. 8 P.M., Mr. S. A. Riddett: (1) Tumour of the Palate. Mr. Percival Cole: (2–4) Pedicle Bone Graft for Fractured Mandible. Mr. J. G. Turner: (5) Spread of Caries. (6) Enamel Hypoplasia. Mr. Frank Coleman: (7) Fracture of Mandible. (8) Cyst of the Mandible. (9) Extra Molar Tooth. Mr. H. O. Dickin: (10) Dental Models Illustrating Development under Treatment by Means of Oral Screens. Mr. F. N. Doubleday: (11) Widening of the Aperture of the Mouth. (12) Hypertrophic Gingivitis treated without Operation. Mr. A. L. Packham: (13) Unilateral Fibrous Ankylosis of Right Temporomandibular Joint in a Child of 8 years. Mr. W. Warwick James: (14) An Old Fracture of the Mandible. (15) Necrosis of the Mandible.

FRIDAY.

Anæsthetics. 8.30 P.M., Dr. C. L. G. Pratt: Some Physiological Points of Importance in Anæsthesia.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.

MONDAY.—8.30 P.M., Dr. James Maxwell and Mr. R. C. Brock: Diagnosis and Treatment of Lung Abscess.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

UNIVERSITY OF GLASGOW.

TUESDAY.—4.30 P.M. (Tennent Memorial Building, Church-street), Dr. John Marshall: Diseases of Eyelids, Conjunctiva, and Cornea.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland-place, W.

WEDNESDAY.—3.30 P.M., Dr. Leonard Findlay: The Family as a Unit in National Health.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.

MONDAY.—2.30 P.M., Sir Edmund Spriggs: Diseases of Small and Large Intestine.

WEDNESDAY.—Noon, clinical and pathological conference (medical). 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Prof. C. R. Harington, F.R.S.: The Thyroid and its Secretions.

THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration. 3.30 P.M., Dr. T. N. MacGregor: Hormone Therapy in Gynæcology. 4.30 P.M., Mr. Kenneth Walker: Venereal Diseases.

FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. Geoffrey Keynes: Diseases of the Breast.

Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY, March 31st.—2 P.M., Dr. Wilfred J. Pearson: Infant Feeding: on the Bottle. 3 P.M., Mr. Eric Lloyd: Knock-knee.

Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

NATIONAL HOSPITAL, Queen-square, W.C.

MONDAY.—3.30 P.M., Dr. C. P. Symonds: Cerebral Tumours.

TUESDAY.—3.30 P.M., Dr. F. M. R. Walshe: Progressive Muscular Atrophy.

WEDNESDAY.—3.30 P.M., Dr. Walshe: clinical demonstration.

THURSDAY.—3.30 P.M., Dr. Denis Brinton: Vascular Disease of the Nervous System.

FRIDAY.—3.30 P.M., Dr. E. A. Carmichael: The Myopathies.

Out-patient clinic daily at 2 P.M.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W.

TUESDAY.—5.30 P.M., Dr. J. M. H. Campbell: Aortic Disease.

CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.

FRIDAY.—4 P.M., Mr. J. D. McLaggan: Tuberculosis of the Larynx.

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HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL, N.W.

WEDNESDAY.—4 P.M., Dr. C. Rickword Lane: The Blood Sedimentation-rate.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY to SUNDAY.—ROYAL CHEST HOSPITAL, City-road, E.C., Mon., Wed., and Fri. at 8 P.M., advanced course in chest and heart diseases (open to non-members).—WEST END HOSPITAL FOR NERVOUS DISEASES, Welbeck-street, W., afternoon course in neurology.—WEST END HOSPITAL FOR NERVOUS DISEASES, Welbeck-street, W., Tues., 8.30 P.M., demonstration on fundus oculi.—ROYAL EYE HOSPITAL, St. George's-circus, S.E., afternoon course in ophthalmology.—PARK HOSPITAL, Hither-green, S.E., Sat. and Sun., course in fevers.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.

FRIDAY.—4.30 P.M., Dr. A. P. Cawadias: Physical Medicine in Metabolic and Gastro-intestinal Diseases (2).

MANCHESTER ROYAL INFIRMARY.

FRIDAY.—4.15 P.M., Dr. Fergus R. Ferguson: clinical demonstration.

ANCOATS HOSPITAL, Manchester.

THURSDAY.—4.15 P.M., Dr. Arnold Renshaw: Certain Poisons: their Mode of Detection.

LEEDS GENERAL INFIRMARY.

TUESDAY.—3.30 P.M., Mr. Digby Chamberlain: Carcinoma of the Stomach.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.

WEDNESDAY.—4.15 P.M. (Western Infirmary), Dr. J. G. Macgregor-Robertson: Venereal Disease in Men.

Appointments

BELL, A. L. W., F.R.C.S. Edin., Resident Surgical Officer at St. John's Hospital, Lewisham.

BUTTERS, A. G., F.R.C.S. Edin., Resident Surgical Officer at the King Edward VII Hospital, Windsor.

BUXTON, ROBERT, M.B. Camb., D.O.M.S., Hon. Ophthalmic Surgeon to the Weston-super-Mare General Hospital.

CARSON, J., M.B. Edin., Second Assistant Medical Officer to the Brighton County Borough Mental Hospital, Haywards Heath.

CROWLEY, TIMOTHY, M.B. Edin., Assistant Medical Officer at the Royal Eastern Counties Institution, Colchester.

HUNTER, DONALD, M.D., F.R.C.P. Lond., Hon. Physician to the London Hospital.

KENNEDY, D. P., M.B. Dubl., F.R.C.S. Irel., Assistant Medical Officer at Southlands Hospital, Shoreham-by-Sea.

NAPIER, F. J., M.R.C.S. Eng., D.P.M., Deputy Medical Superintendent at the Leicestershire and Rutland Mental Hospital, Narborough.

PROBERT, WINIFRED E., M.R.C.S. Eng., D.P.H., Assistant Medical Officer for Monmouthshire.

SAWYER, G. C., M.B. Lond., F.R.C.S. Eng., Surgical Registrar at Charing Cross Hospital.

London County Council.—The following appointments have been made to the council's pathological service:—

BARBER, MARY, M.B. Lond., Archway Hospital;
BODOANO, AGNES M., M.B. Manch., L.M. Dubl., Lewisham Hospital;
GLASS, VLADIMIR, M.B. Lond., St. Mary Abbots Hospital;
KAY, W. W., M.Sc., M.B., Manch. Archway Hospital; and
GIBSON, ANNE, M.D. Edin., Lambeth Hospital.

Certifying Surgeons under the Factory and Workshop Acts: Dr. H. ADDISON (Thirsk District, York, N.R.); Dr. J. S. MACBETH (Kibworth District, Leicester).

Vacancies

For further information refer to the advertisement columns

Accrington, Victoria Hosp.—H.S., £175.
Ashton-under-Lyne, District Infirmary.—Res. Surg. O., at rate of £200.
Ashton-under-Lyne, Lake Hosp. and Darnton House Institution.—Sen. and Jun. Res. M.O.'s, £250 and £225 respectively.
Aylesbury, Royal Buckinghamshire Hosp.—Sen. and Jun. Res. M.O.'s, at rate of £200 and £150 respectively.
Bedford County Hosp.—H.S., at rate of £155.
Belgrave Hosp. for Children, Clapham-road, S.W.—Two H.P.'s and one H.S., each at rate of £100.
Birmingham City Education Committee.—Two Asst. School M.O.'s, each £500.
Birmingham and Midland Eye Hosp.—H.S., at rate of £130.
Blackburn County Borough.—Asst. M.O.H. and Asst. School M.O., £600.
Bolton Borough Isolation Hosp.—Res. Asst. M.O., £450.
Bradford Royal Infirmary.—Five H.S.'s, each at rate of £150.
Brighton, Royal Sussex County Hosp.—Cas. H.S., £120.
Bristol City and County.—Asst. M.O.H., £500.
Bristol Eye Hosp.—Jun. H.S., at rate of £100.
British Postgraduate Medical School, Ducane-road, W.—H.S., £105.
Buxton, Devonshire Royal Hosp.—Res. M.O. or H.P., at rate of £200 and £150 respectively.
Charing Cross Hosp., W.C.—Cancer and Radium Registrar, £100.
Chester, Barrowmore Tuberculosis Sanatorium and Settlement, Great Barrow.—Jun. Asst. M.O., at rate of £200.
Chester Royal Infirmary.—H.S., £150.
Derbyshire County Council.—Asst. Maternity and Child Welfare M.O., £600.
Derbyshire Royal Infirmary.—H.S. for Ear, Throat, and Nose Dept., £150.
Dorchester, Dorset County Hosp.—H.S., at rate of £150.
Dudley, Guest Hosp.—H.S., £100–£130.
Eastbourne, Princess Alice Hosp.—Res. H.S., £150.
Edinburgh, Gogarburn Certified Institution, Corstorphine.—Asst. M.O., £300.
Elizabeth Garrett Anderson Hosp., Euston-road, N.W.—Clin. Asst. to Ophthalmic Dept. Out-patients, £50. Also Hon. Asst. Anæsthetist, £10.
Evelina Hosp. for Sick Children, Southwark, S.E.—H.S., at rate of £120.
Exeter, Princess Elizabeth Orthopædic Hosp.—Res. H.S., at rate of £150.
Guildford, Royal Surrey County Hosp.—Res. Surg. O., £250.
Harefield, County Sanatorium.—Visiting Anæsthetist, 3 guineas per session.
Holland (Lincs) County Council.—Asst. M.O.H., £600.
Hosp. for Sick Children, Great Ormond-street, W.C.—Res. Med. Supt. and Out-patient Aural Registrar, £200 and £175 respectively. Also two H.P.'s and two H.S.'s, each at rate of £50.
Hosp. of St. John and St. Elizabeth, 60, Grove End-road, N.W.—Res. H.S., at rate of £75.
Hove General Hosp.—Jun. Res. M.O., at rate of £120.
Huddersfield County Borough.—Asst. M.O.H., £500.
Hull Royal Infirmary.—Second H.P., at rate of £150.
Ilford, King George Hosp.—H.S., at rate of £100.
Infant Hosp., Vincent-square, Westminster.—Clin. Assistantships.
Ipswich, East Suffolk and Ipswich Hosp.—Cas. O., £144.
King Edward Memorial Hosp., Ealing.—H.S., at rate of £150.
Leeds, St. James's Hosp.—H.P.'s and H.S.'s, each at rate of £150.
Leicester City General Hosp.—Res. M.O., at rate of £300.
Leicester City Mental Hosp.—Asst. M.O., £350.
Liverpool City.—Jun. Asst. Bacteriologist, £400.
Liverpool, St. Paul's Eye Hosp.—H.S., at rate of £145.
London Chest Hosp., Victoria Park, E.—H.P., at rate of £100.
London County Council.—Sen. Asst. M.O. (Grade II), £500. Also Asst. M.O.'s (Grades I and II), £350 and £250 respectively.
London Hosp., E.—Clin. Asst. in X Ray Dept., £100.
London Lock Hosp., 283, Harrow-road, W.—Res. M.O., at rate of £175.
Maidstone, West Kent General Hosp.—H.S., £175.
Manchester, Ancoats Hosp.—Res. Surg. O., £200.
Manchester Royal Eye Hosp.—H.S., £120.
Manchester Royal Infirmary.—M.O. to Out-patients, £105.
Mansfield, Harlow Wood Orthopædic Hosp.—Surg. Reg., £450. Also H.S., at rate of £200.
National Hosp. for Diseases of the Heart, Westmoreland-street, W.—Res. M.O., at rate of £150.
National Temperance Hosp., Hampstead-road, N.W.—Cas. O. and H.S., at rate of £120 and £100 respectively.
Norwich City.—Asst. M.O.H., &c., £600.
Nottingham City.—Asst. M.O. for Maternity and Child Welfare, £500.
Nottingham General Hosp.—H.P., at rate of £150.
Nottingham, Mapperley Hosp.—Locum Tenens M.O., 7 guineas per week.
Oxford University.—First Asst. in Dept. of Clin. Medicine, £600.
Paddington Green Children's Hosp., W.—H.P. and H.S., each at rate of £150.
Plaistow Fever Hosp.—Jun. Asst. M.O., £300.
Plymouth City Isolation Hosp.—Asst. Res. M.O., £300.
Portsmouth Education Committee.—Asst. M.O.H. and Asst. School M.O., £500.
Preston, Biddulph Grange Orthopædic Hosp.—Asst. Visiting Orthopædic Surgeon, £250.
Queen's Hosp. for Children, Hackney-road, E.—Cas. O., £100.
Reading, Royal Berkshire Hosp.—H.S., H.P., and H.S. to Special Depts., each at rate of £150.
Richmond Royal Hosp., Surrey.—Jun. H.S., £100.
Royal Air Force Dental Branch.—Dental Surgeons.
Royal Army Medical Corps.—Commissions.
Royal Free Hosp., Gray's Inn-road, W.C.—Res. Cas. O., £150.
Royal London Ophthalmic Hosp., City-road, E.C.—Out-patient O., £100.
Royal Naval Medical Service.—Medical Officers.
St. Bartholomew's Hosp., E.C.—Part-time Chief Asst. in X Ray Diagnostic Dept.
St. Paul's Hosp. for Urological and Skin Diseases, Endell-street, W.C.—H.S., at rate of £100.
Salisbury General Infirmary.—H.S., at rate of £125.
Salop County Council.—Asst. M.O., £500.
Sheffield, Wadsley Mental Hosp.—Asst. M.O., £350.
Stirling District Mental Hosp., Larbert.—Jun. Asst. M.O., £300.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—H.S., at rate of £150. Also Res. Anæsthetist, £150.
Swansea General and Eye Hosp.—H.P., at rate of £150.
University of London, University College, W.C.—Bucknill Scholarship, 160 guineas. Also two Exhibitions, each 55 guineas.
Windsor, King Edward VII Hosp.—Hon. S. for Ear, Nose, and Throat Dept.
Wolverhampton, New Cross Hosp.—Res. Asst. M.O., £200.
Woolwich and District War Memorial Hosp., Shooters Hill, S.E.—Res. M.O., £150. Also H.S., at rate of £100.
Worcester Royal Infirmary.—Jun. H. S., £120.
York City.—Asst. M.O.H., at rate of £350.
York County Hosp.—H.S., £150.

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NOTES, COMMENTS, AND ABSTRACTS

THE SUBURBAN NEUROSIS

BY STEPHEN TAYLOR, M.B., M.R.C.P.
SENIOR RESIDENT MEDICAL OFFICER, ROYAL FREE HOSPITAL

THOSE whose duty it is to deal with the "poor teaching cases" in the medical out-patient departments of the great London hospitals soon find that most of their patients fall into a few large but not very clear-cut groups. First come the menopausal osteo-arthritics, with or without hypertension and early signs of congestive failure. Then there are the chronic bronchitics and patients with long-standing indigestion, in whom no definite lesions, beyond a few rhonchi or a little tenderness, can be discovered. Finally, there are the great concourse of neurotics, some well hospitalised and saturated with the not very efficacious mixtures intended for their more organic friends, others, less regular visitors as a rule, scarcely to be distinguished from early cases of Graves's disease.

After four years of such work, I have gained the impression that, among the neurotics, there has been a decline in the number of simple old "bottle-of-medicine" loving patients, their places being taken by less poverty-stricken young women with anxiety states, the majority of whom present a definite clinical picture with a uniform background. It is my aim here to describe that picture—not in academic terms, but in the words of the patients themselves—and to throw a little light on that background. I hope to show that environment plays no less a part in the production of what I venture to call "the suburban neurosis," than it does in the production of physical disease.

CLINICAL PICTURE

Mrs. Everyman is 28 or 30 years old. She and her dress are clean, but there is a slovenly look about her. She has given up the permanent wave she was so proud of when she was engaged. Her clothes, always respectable and never as smart as those young hussies who work in the biscuit factory, are, like her furniture, getting a little shabby. They hang on her rather as a covering than as something to be worn and made the most of. She is pale but not anæmic. Her hæmoglobin is 86 per cent. She has left the child outside in the waiting-room. As she sits down I notice that her hands are shaking.

"I've been to my own doctor," she begins, "but he gave me a bottle of medicine and told me it was nerves. I wasn't satisfied, so I've come to see you. It can't be nerves, doctor; I feel such a . . ." Then follows the principal symptom. Here are a few of them:—

Lump in my throat that goes up and down, or round and round.
Trembling all over, and I jump at the slightest noise.
Continuous gnawing, nagging headache.
Stabbing pains over my heart.
Pain in my back which runs up and down.
My stomach swells up terribly.
Nasty taste in my mouth.
So short of breath when I hurry.
Terrible buzzing in my ears.
I can't sleep at night.
I'm getting ever so thin. . . .
And so on.

Whatever the principal symptom, several of the others are certain to be there as subsidiaries.

On examination, there is a definite but variable tremor, a definite but variable tachycardia, pendulous flabby breasts, poor abdominal muscles, very brisk reflexes, and nothing else. Watched over two months, she will gain or lose a pound. She will show no exophthalmos, no goitre, and neither hypernor hypotension.

All too often at the top of her notes will be written "N." or "HYS."; she will receive perhaps a bottle of Mist. Pot. Brom. Co.; she will be referred on to the junior assistant, who will in due course write "Rep." on her treatment sheet—and she will be forgotten.

THE TRUE HISTORY

Her parents were respectable, and kept themselves to themselves. After school, she went to a shorthand college, and from there to a business house in Brixton. All day she added up figures, in the train she skimmed the *Daily Peepshow*, three times a week she went to the cinema, and such mind as school had developed withered and retrogressed. Then love, in the shape of Mr. Everyman, came along. He, too, was a clerk in the Brixton business house. And the boss, who knew enough of human nature to agree with Bacon—"He that hath wife and children hath given hostages to fortune; for they are impediments to great enterprises, either of virtue or mischief"—liked to see his young men married.

So, after two years of saving, and those lovely walks around Box Hill at the week-ends, they took the plunge into a small semi-detached hire-purchase villa on the wonderful new Everysuburb estate, adjacent to one of our great by-passes and only twenty minutes from the station. The estate was Mr. Jerrybuilder's fifth successful venture in the property market. By this time he had thoroughly mastered the technique of using the cheapest unseasoned timber, the lightest of breeze brick, and the smartest of bathroom fittings.

All their savings went on the first instalments on the house and furniture. Mr. Everyman was an inexperienced lover, and the physical side of marriage shocked and disappointed his wife. After a year of rather unsatisfactory birth control, during which time the thrill of a "home of her own" had worn off, they decided to risk a baby. In due course baby came, and for about a year and a half kept Mrs. Everyman's hands pretty full. Then things began to slacken up. She had developed a routine for doing the housework quickly. She had to think a little about the shopping, but the cooking she did almost blindly. The *Peepshow* didn't take long to read, and the wireless was always the same old stuff. They hadn't been able to get away for a holiday as they had hoped; baby had cost more than they bargained for. Hubby had started to grumble at her. Then baby had been a bit fretful lately. She couldn't understand it. She'd been so careful with him. He couldn't have picked up anything. She hadn't let him mix with other children.

One day there had dropped in through the letter-box a circular. It was sent out by the local doctors, and it was all about cancer. It said cancer did not hurt at first, and if you took it early it was all right. "Took it early." That meant an operation. It was bad enough when baby came, but an operation! Then she remembered that pain in her back. She'd noticed it at first when she was doing the housework, and she thought she must have strained herself. But it had stayed on. Cancer didn't hurt *at first*. Her back was hurting. What if it were? And she was losing weight, too. Hadn't hubby said she wasn't as nice to cuddle as she used to be? What if she did get ill? Not cancer, but just something she had to go into hospital with. Baby would have to go to mother's, and *she* didn't want him. And hubby's cousin would have to come and look after him. That woman! She never had liked her—didn't trust her really. The way she looked at men. Just as though she wanted to eat them.

Suppose hubby should lose his job—or get ill. Then what? They'd fall behind with the instalments.

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Then they'd take the furniture. And they'd have to live in rooms—or take a lodger. Perhaps they couldn't get one. You never saw notices up in Acacia-row with "Bed and Breakfast. Gent preferred" on them, like you did in London. What would the neighbours say?

If only she'd got someone to talk to. Somehow she couldn't tell hubby. He'd say she was just being silly. They'd been there three years and she only knew three people on the estate. There were the neighbours, but you couldn't call them neighbourly. And that Mrs. Smith in Paradise-avenue, who'd asked her round to tea. Then, when she found she couldn't play cards, she'd not asked her any more. The curate had called once, when hubby was at work. Quite a nice young chap. He'd asked her to come to the Church social. But hubby had said no. And anyhow, you couldn't believe in religion much nowadays. Not with the newspapers, and all this war, and gas-masks for babies.

Then hubby did get ill—neuritis. Sciatica, the doctor had called it, and they'd had to get a plaster for it, and she'd been so busy she didn't know what to do. Her pain hadn't been so bad then. In fact, she'd forgotten about it altogether. She'd been sleeping better, too. None of that horrid sex business either. She'd just cuddled up close to him and known it was all right. The boss had been decent about it, and they'd managed the money somehow, and in six weeks the doctor said he could go back to work.

Then that pain had started all over again, worse than ever; she couldn't stick it. The house was getting her down. If only they could move to a little flat somewhere, with real live people all around. When would the instalments finish? Only twenty-one years, Mr. Jerrybuilder had said. 1956—Oh God!

After weeks and weeks of it, she'd plucked up courage and gone to the doctor, and he'd said it was nerves! Nerves—what had she got to be nervous about? Why, when hubby was bad, she'd been as right as rain. But there it was, nag, nag, nag. She'd take something, that's what she'd do. Or put her head in a gas-oven. No, it was too horrible. She couldn't face that. She'd try the hospital instead.

And so at last to "minor medical out-patients"—and me.

ÆTIOLOGY

Let me translate this miserable little story into medical jargon. The deep-seated ætiological factors of the suburban neurosis are, no doubt, extremely complex. The stomach which swells represents perhaps an unconscious urge to further motherhood, the sleepless nights a longing for a full sex life. Existence in the suburbs is such that the self-preserving, race-preserving and herd instincts can be neither adequately satisfied nor sublimated. The barriers to satisfaction and sublimation are the superficial or "trigger" causes of the condition, while the symptoms—pathological anxiety, somatic manifestations, failure of conation, and failure of affect—represent a side-tracking of the frustrated emotional energy.

The superficial causes are as follows:—

1. *Boredom*, occasioned by—

(a) *Lack of friends.*—Few who have not worked or lived in the suburbs can realise the intense loneliness of their unhappy inhabitants. There is no common meeting-ground like the pub and the street of the slum dwellers, and the golf and tennis club of the upper-middle classes. There is no community of interest such as is found in the village. Lack of individual enterprise, shyness, and bashfulness prevent calling, and the striking up of friendships. It is respectable to keep oneself to oneself. The Englishman's home is still his castle, but for the Englishwoman too often it is her gaol.

(b) *Not enough to do.*—As long as the housework, the baby or the sick husband keep the young wife busy, all is fairly satisfactory. But once these cease to occupy her she is left with time on her hands, and she starts to think, a process for which she is completely unadapted.

(c) *Not enough to think about.*—At school she was not taught to use her brain for her own amusement. Since then, all the stimuli reaching her not very adequate cerebrum have been designed to inhibit rather than to stimulate thought. The papers she reads and the films she sees are all of the "flash-in-the-pan" wish-fulfilment variety. The wireless, of necessity, dare not be provoking. She has no knowledge of what books to read, nor how to set about getting them. The wisdom of the world, if she did but know it, is waiting for her on the station book-stall, at sixpence a time.

2. *Anxiety.*—Anxiety is of two great kinds—justifiable and unjustifiable. To be anxious in an aeroplane is still justifiable. To be anxious in a railway train is not. This dogmatic statement requires qualification. A Solomon Islander riding in his first train would be justifiably anxious. Justifiable anxiety may vanish or become unjustifiable in the face of knowledge and experience. Unjustifiable anxiety is pathological, and is ready to attach itself to the most commonplace events. It is, of course, a psychoneurotic symptom.

The patient suffering from the suburban neurosis shows both kinds of anxiety, though unjustifiable anxiety is symptomatic rather than causative. Our patient is justifiably anxious about—

(a) *Money and the house.*—Her little family is not merely living in a hand-to-mouth way. It has taken on commitments which tie it for the next twenty-one years. By the time the payments on the house and furniture are completed, the value of both will be very much less than the amount paid for them. In fact, they may actually be unrealisable. Prolonged sickness, or the loss of a job on the part of the wage-earner may mean the loss of such savings as the instalments paid represent, the break-up of the home, and the disappearance of "respectability." Further, if the house should prove unsuitable or unsatisfactory—as it probably will—the chances of getting out of it are extremely remote.

(b) *Another baby.*—The safest forms of birth control are physically the least satisfactory. But even if only the safest forms are used, there is always the possibility of an accident, and another child would just push the family budget over to the wrong side. This fear is extremely common in the one-child family.

3. *A false set of values.*—The suburban woman has made a fetish of the home. She is aiming at the kind of life successfully led by people to whom books, theatres, and things of the intellect matter. To them, the home is a necessary part of life, but only a part. To her, because she does not see the rest, the home looks like everything, and she wonders why it does not bring her the happiness it appears to bring to them.

The other set of values she is offered is that of the *Daily Peepshow* and the weekly cinema. In both, she sees continuous "tempests of emotion"—uncouth marriages of elderly clergymen to young parishioners, torsos daily discovered in trunks, romatic love triumphing over New York's press men, and plumbers made rich beyond dreams by Saturday's football pools. One cannot blame her for expecting at least a little of other people's thrills. But there *is* no thrill in Everysuburb.

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SYMPTOMATOLOGY

The presenting symptom is usually somatic, but a greater or lesser degree of unjustifiable anxiety is always present as well. It may crystallise out as fear of cancer or of the baby's ill health, or, rarely, of the husband's unfaithfulness. Reassurance on any of these scores, unaccompanied by further treatment, will simply cause it to attach itself to some new object.

The paralysis of feeling and striving resembles, in a small way, that seen in melancholia. I believe the failure of affect to be both symptomatic and causative—a vicious circle which feeds upon itself. The objects of the emotions are gradually seen through, and the emotions themselves begin to lack conviction. Physical love is a disappointment, the husband turns out to be rather ordinary and grumpy, the house is seen for what it is, a tawdry jerry-built box, and even the child is not as wonderful as was hoped. "After all," the wife says, "you can't go on feeling when things aren't worth feeling about."

The same applies to the failure of conation. The loss of urge to strive is combined with a very reasonable appreciation of the hopelessness of striving. The decline in religious faith, without a corresponding growth of any of the new state creeds (communism, fascism, &c.) has left a great part of the population without any raison d'être, or any positive ideal towards which to work. This does not matter so much, provided the individual concerned has little time on his or her hands. But the small, labour-saving house, the small family, and the few friends have left the women of the suburbs relatively idle. They have nothing to look forward to, nothing to look up to, and little to live for.

It will be seen that ætiology and symptomatology overlap, and that superficial ætiological factors make a formidable list before which the finest minds might quail. What wonder that the underdeveloped, relatively poor mind of the suburban woman seeks an escape in neurosis?

No doubt the roots of these neuroses lie buried deep in a heap of infantile and adolescent manure. But without the stimulus of the superficial factors, these roots do not bear fruit. It is only when the environment fails so hopelessly that the neurosis becomes manifest. And when the environment gives at least a little satisfaction—the sick husband, the busy day, the new baby—the symptoms once more vanish.

TREATMENT AND PROPHYLAXIS

If it were possible to establish on each new estate a team of psycho-analysts, the suburban neurotics might learn to see themselves as they are, and carry on and even reconstruct their unsatisfactory lives without developing symptoms. It is hard, however, to imagine a more inverted way of doing good—or, for that matter, a more costly one.

The treatment of the individual case is beset with difficulties. It calls for enthusiasm and perseverance. At the start a complete physical examination, followed by unqualified reassurance, is essential. One must attempt to reawaken interest in life. A club of some kind, or a pub, is a great help, but all too often neither is available, or the pub is by unwritten law for men only. A carefully graded reading list is perhaps of more use than a bottle of medicine. Another baby, rather than a new wireless, if it can be afforded, may effect a permanent cure. If the house can be disposed of, a flat near a few friends may work wonders. But all too often one finds oneself up against a deadlock of unpleasant and hopeless reality. The psychological out-patient department is in most hospitals already overcrowded, so one attempts a very superficial analysis. Gross physical difficulties in the sex life are straightened out, but the neurosis persists. And as long as life offers the suburban woman so little to live for, so long will she continue at last to pluck up her courage and add to the numbers in our out-patient waiting halls.

We have, I fear, let matters go too far in the jerry-building, ribbon-development line to institute an entirely satisfactory scheme of prophylaxis. We have allowed the slum which stunted the body to be replaced by a slum which stunts the mind. Perhaps, like a pack of cards, these rotten little houses will in due course collapse. Perhaps, when the children grow up, they will break down the barriers which separate family from family. But even this hope may prove false. Instead, the child may see through the values of its family and come to despise it. Or its over-proud parents may push it into a job for which it is intellectually unqualified—and one more neurotic will be launched on its way.

Meanwhile, our best plan is, I think, to establish on these new estates social non-religious clubs, catering for all possible interests. Under one roof one would like to see a swimming bath and gymnasium, a cafeteria, a day nursery, the public library, and reading, smoking, and games rooms—something not unlike the Pioneer Health Centre at Peckham, without perhaps such a positive emphasis on health as the main motive of life. Such a club would give the suppressed herd instinct of the unhappy inhabitants of the Everysuburb estate a chance to express itself. And in a corporate life, affect and conation would find new outlets. It has been suggested that these new communities will only develop a true corporate sense with some revival of individual local leadership, analogous to the old village squirarchy. Perhaps the success of the totalitarian states with their lower-middle classes is due to just such a reassertion of the "Leader Principle."

The prevention of the suburban neurosis, then, is in the hands of the social workers and politicians. And if they require a purely selfish stimulus, one would remind them that, in the latent feelings and strivings of the new mental slum-dwellers, there is waiting a most hopeful field for the teachers of new, and possibly dangerous, political ideologies.

DRINKING WATER IN AMERICAN TRAINS

THE United States public health service have investigated[1] the purity of the drinking water provided by nine railway companies operating in or near New York City. They took a thousand or more samples from trains which could conveniently be reached during working hours, with no attempt at selection. Each sample was cultivated in five 10 c.cm. tubes and if three tubes gave a growth of the coli-aerogenes group the sample was considered unsatisfactory. Three of the nine companies had considerably more unsatisfactory samples than the others, their figures being 7, 12, and 16 per cent. unsatisfactory, compared with from 0 to 3 per cent. for the remaining six companies. The water supplied to these lines from the mains is known to be pure, so the authorities conclude that at least two companies are cleaning their containers inefficiently or allowing the water to be contaminated through careless handling.

[1] *Publ. Hlth Rep., Wash.* Feb. 25th, 1938, p. 300.

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JOHN BRUCE MACCALLUM

A BRILLIANT young American histologist and experimenter, John Bruce MacCallum died of tuberculosis in 1905 at the early age of 29 years. His biography[1] is well worth reading. He was educated at Toronto and at Johns Hopkins where he made many interesting contacts—among others, Osler, Welch, Barker, Simon Flexner, Mall, and the McCraes. While not yet 21 and while an undergraduate in medicine he made a remarkable and still memorable investigation on the histogenesis of the cardiac muscle cell. In spite of continued ill health he had published some two dozen papers by the time of his death, some of them of considerable merit. On leaving Johns Hopkins he went to Denver, Colorado, where it was hoped his health would improve, and he there made an abortive attempt at general medical practice. His comment on this phase of his career was that only one of the three C's—cupidity, crime, or consumption—would drive a man to Denver; so it is not surprising that he soon left it to take up a post with Jaques Loeb, who had recently been appointed to a chair at Berkeley, California. There he did some good work on the general physiology of purgatives. MacCallum undoubtedly had unusual gifts—his teachers, including Osler, looked upon him as something of a prodigy—and he had the charm and appeal that so often characterises the poitrinaire. He was highly temperamental and given to fits of both depression and elation, and his brief life seemed to be lived in "Sturm und Drang." But he was on the whole cheerful and sanguine, and met life in all its angles gladly. MacCallum's letters and his entries in his notebooks, which make up the bulk of Dr. Malloch's volume, make good reading. As Dr. Alfred Cohn notes in a letter to the author, this biography gives a vivid picture of the Toronto and Johns Hopkins schools during a very brilliant period, as well as an account of the life of an able and engaging personality.

AN INJURY OF THE HEART

E. Ortega describes a somewhat unusual case of injury caused by a stab-wound in the precordial region (*Anal. Soc. méd. quir. del Guayas*, 1937, 28, 205).

The patient, a young man, was admitted to hospital with a history of having been stabbed eight hours previously. On examination a wound was found in the sixth intercostal space, 5 cm. from the midline. The pulse was regular at 120. The apex-beat could not be felt; the heart sounds were distinct. Respiration was shallow and rapid (30 per minute). The abdomen was acutely tender all over, especially in the epigastrium, and rigid. There was dullness in both flanks and in the lower abdomen, and a tympanitic area including the umbilical and epigastric regions. The liver dullness was abolished. The skin and mucous membranes were blanched.

In view of the grave abdominal symptoms an exploratory laparotomy was immediately undertaken under ether anæsthesia. It revealed a large wound in the diaphragm, through which jets of blood escaped at regular intervals into the peritoneal cavity. None of the abdominal viscera was injured.

The abdominal wound was closed as rapidly as possible and the thoracic cavity opened by a flap incision. The pericardial sac was opened, the contained blood mopped out, and the heart examined. In the wall of the right ventricle was a longitudinal wound 2 cm. long, through which formidable bleeding was taking place. Without displacing the heart, three sutures of No. 4 catgut were inserted to close the wound, all three being made to penetrate the cavity of the heart. The wound in the diaphragm was sutured, and the pleural cavity and the parietal wound closed. Stimulants and intravenous salines were given and the patient recovered. He subsequently developed what appeared to be a small pulmonary embolus followed by a patch of pneumonia, and a residual hæmothorax required aspiration; but these were the only complications. The operation wounds healed by first intention and the patient was fit for discharge by the eighteenth day after the accident.

The points of interest in this case are the length of time which elapsed between the accident and the successful operation, despite the large size of the wound in the heart; and the predominance of symptoms of "acute abdomen."

SPEECH TRAINING IN CLEFT PALATE CASES

THE surgeon who has repaired a cleft palate feels some responsibility for the functional end-result of his work. Two little books recently published on the subject of speech training are worth his notice. Mr. M. C. Oldfield[1] gives detailed instructions for the production of sounds of the various vowels and consonants and these are accompanied by illustrations of the respective position of the tongue, palate, and lips. He praises the pioneer work of Freda Parsons and Joan van Thal and their influence can be traced in the text of this well-illustrated introduction to speech training.

Mr. Pickerill's book[2] has been written for the use of patients themselves or their guardians. The subject matter is for lay consumption. Brief answers are provided to such questions as "What exactly is a cleft palate?" "Why did the two sides not join?" "Is the condition hereditary?" which even if not put into words are always in the minds of those troubled by the presence of a congenital defect of this sort. A mother whose child has a cleft palate will be glad of this book, especially if the facilities of a speech training clinic are not available.

MUNICIPAL YEAR BOOK

THE 1938 edition of the Municipal Year Book and Encyclopædia of Local Government Administration[3] is the biggest since the volume was founded in 1897. It is divided into fifty sections, and there is a comprehensive survey of local government developments in 1937, followed by a review of all the principal law cases of last year affecting local government, and details of the chief legislation of the last Parliamentary session. There are sections on housing, town and country planning, public health services, parks and open spaces, sewage disposal, public cleansing service, and water-supply. The first review of county districts under the Local Government Act, 1929, has made many changes in the urban and rural districts of the country, and these are all noted in this new volume. Sir Kingsley Wood, the Minister of Health, contributes a general preface.

AT their new house, 2, Bentinck-street, W.1, Messrs. AMPLIVOX LTD. will have available for demonstration every form of hearing device from post-office amplifier to silent bell systems. Medical men are invited after April 4th to inspect these instruments.

ERRATA.—The reference in a footnote on p. 210 of our issue of Jan. 22nd should run as follows:—

[3] Elliot, M. M., Nelson, E. M., Barnes, D. J., Browne, F. A., and Jenss, R. M., *J. Pediat.* 1936, 9, 355.

IN the article by Dr. E. D. Hoare, published in THE LANCET of March 19th, line 3 of the heading of Tables I to VI (p. 656) should read SC = SULPHAMIDECHRYSOIDINE.

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[1] Short Years. The Life and Letters of John Bruce MacCallum, M.D., 1876–1906. By Archibald Malloch. Chicago: Normandie House. 1938. Pp. 343. $3.50.

[1] Speech Training for Cases of Cleft Palate. By M. C. Oldfield, M.Ch. Oxon., F.R.C.S. London: H. K. Lewis. 1938. Pp. 20. 4s. 6d.

[2] Speech Training for Cleft Palate Patients. By H. P. Pickerill, C.B.E., M.D., M.S., F.R.A.C.S. London and New Zealand: Whitcombe and Tombs. 1938. Pp. 36. 4s. 6d.

[3] Published by the Municipal Journal, Ltd., 3 and 4, Clement's Inn, Strand, London, W.C.2. Pp. 1712. 30s.

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